COAL AGE

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Are *You* Thoroughly Posted on Explosives?

IF several demonstrators of rival powder companies get busy at a mine simultaneously, every one connected with that mine will be talking gas pressure and velocity and shattering effects and ammonium nitrate and organic nitrate, etc., and, what's more, they will enjoy the discussion.

We know of several instances where powder demonstrators have made possible a cleaner grade of coal with a lower powder cost to the miner. Because it happens that as a rule miners have to pay the explosives bill, many superintendents take only small interest in that part of the game.

When permissible explosives were first exploited, these same mine officials adopted the new powders and are still using them; however, if you question these men you'll find that they don't even know that many changes have been made in explosives since then, and that each new brand put on the market meets a need that some mine manager, superintendent or engineer has suggested.

If left to themselves, miners always purchase the most powerful explosive that they can obtain. It ought to be evident, therefore, that if a superintendent forbids his miners the use of dynamite and rules simply that they must use a permissible explosive, he is still leaving too much to their discretion.

He may pat himself on the back and say that he has accomplished something from a safety standpoint, but he has not fulfilled his obligations to his employer who has a right to expect the best product that the mine can produce.

And the superintendent is not the only one who can learn from the powder demonstrator. To make the best showing the demonstrator has to determine the most advantageous positions for his holes and also the most economical number required; he does this by drawing on his experiences at other mines where conditions were similar, and also by discussing the matter with the miners who seem to be getting the best results. By the time he finishes his labors, he is quite likely to have hit on a system that will be adopted as standard by all of the men employed in that particular mine.

If several demonstrators for rival companies are working simultaneously, the interest becomes so keen that the post office is liable to be kept busy handling requests for powder information addressed to the Bureau of Mines. It is also at this time that the Bureau's published circulars on explosives are resurrected and passed around very much as the small boy circulates his favorite dime thriller.

THERE are many mine foremen and mine superintendents who have a very hazy understanding of explosives. To all such we would like to suggest that they cultivate the acquaintance of a few powder salesmen and demonstrators and if any of them request the privilege of a test for their explosive, by all means become enthusiastic at once.

Water Sealing the Wet Jed Shafts

By R. G. Johnson*

SYNOPSIS—By a proper method of lining a wet shaft with reinforced concrete and then forcing grout under pressure into the space between the lining and the rock, the influx of water was reduced from approximately 600 gal. per min. to about a pint.

The Jed shafts, near Welch, W. Va., have been completely water-sealed. These shafts were known as being among the wettest in any of the bituminous-coal fields, but by means of a heavily reinforced-concrete lining with a special backing designed to resist the force of cement grout placed under pressure, they were successfully sealed; the flow in the shafts being cut down from something in the neighborhood of 600 gal. of water per min. to possibly a pint.

The methods used and the results obtained in face of the extreme rock and water conditions were new and so full of possibilities for the future that a number of prominent mining engineers made special trips to Jed to see the work, and because of its nature it is believed a description of the procedure followed will be of interest.

The mine was formerly the property of the Jed Coal & Coke Co., and is situated about two and a half miles south of Welch, W. Va., on Tug River. In June, 1913, the property was bought from the receivers of the above named company by the New River & Pocahontas Consolidated Coal Co., the West Virginia corporation of the Berwind interests. Shortly before the purchase, however, the question of handling the water in the shafts was discussed by the management of the coal company. H. M. Bertolet, who is at the head of the operations of the coal company, knowing the success of rock grouting in some of the recent mine shafts, called in the Dravo Contracting Co., of Pittsburgh, to investigate the water and rock conditions in the shafts, with a view to sealing the shafts, if practicable.

With G. S. Borden, chief engineer of the coal company, the writer took cross-sections in the rock at 5-ft. intervals up the hoist shaft, noting rock structure and plotting water flows. A plan was prepared showing the clear inside dimensions of the shaft arranged to take care of the new mine cars which the coal company proposed to use after its remodeling of the mine workings. The position of the new plan was projected on the old shaft layout, and a heavily reinforced concrete lining backed with corrugated sheet iron and canvas was designed, so as to form drainage channels leading to flanged grout pipes, which extended to the inner face of the concrete lining, to lead the water through the lining into the shaft.

Before giving the details of the design, it is absolutely necessary to know something of the history of the conditions which were encountered in the actual sinking of the shafts.

Sinking Original Shafts

The shaft sinking was started in the hoist and air shafts in October, 1905, and almost immediately water in large quantities was encountered in both. The volume of water constantly increased as the sinking progressed. For the first 120 ft., which was in white sandstone, the rock was much broken, so that the water instead of coming from the ribs of the shafts continued to come from the bottom, making it impossible to construct rings for the handling of the water. These conditions of rock and water were found in both shafts. However, from the fact that the deeper shaft soon drained the shallower, it was evident that the two were connected through the crevices.

In the hoist shaft, at a depth of 120 ft., the largest feeder was struck. This was in the shape of a sheet of water about 2 ft. wide and 2 in. thick, and practically represented the accumulation of what the shaft had been making down to this point. It was also evident that an impervious stratum had been encountered in the sinking, for with progress below that point in the hoist shaft the water continued to come from the rib.

When this shaft was 140 ft. deep, or 20 ft. below the largest feeder, it was decided to discontinue sinking and

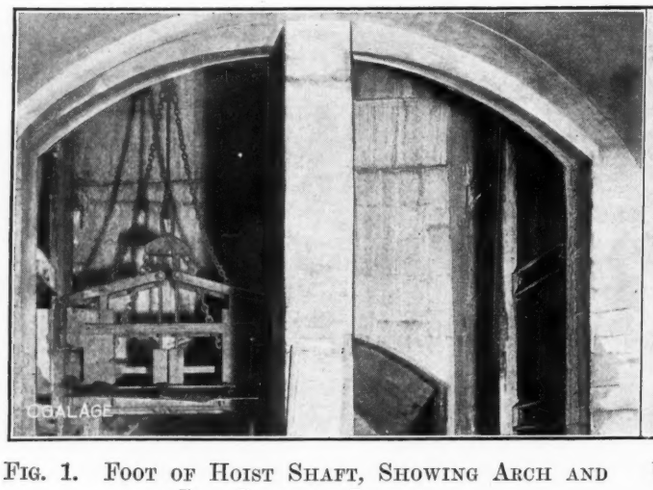

Fig. 1. Foot of Hoist Shaft, Showing Arch and Dry Concrete Lining

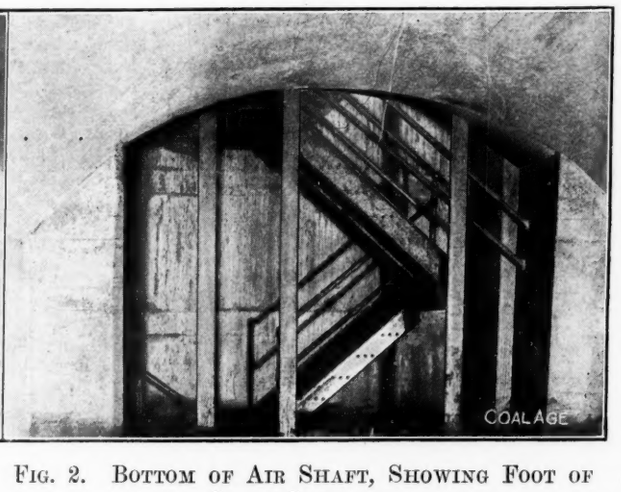

Fig. 2. Bottom of Air Shaft, Showing Foot of Steel Stairway

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install a pumping plant which would take care of the water until the air shaft was completed, it being found that the impervious stratum drained to the hoist shaft. This was done, the air shaft known as No. 2 was sunk to the bottom, a large sump was excavated, a heading driven in the coal to a point directly underneath No. 1 shaft, and the permanent pumping plant installed at the bottom of No. 2. A bore hole was then driven from the bottom of No. 1 to the heading, draining the water to the main pumps.

But on Dec. 8, 1906, just as the sinking of the hoist shaft was about to be started again, the failure of the valves on a 1500-gal. direct-acting pump which the coal company had installed in the permanent pump room, and the failure of the company to have repair parts on the ground, caused the flooding of both shafts. The pump was at that time running constantly up to its capacity, and an additional 1000-gal. Jeanesville and a No. 12 Cameron pump were being installed in the pump room.

Pumping from the contractor's sinking plant was commenced in the flooded air shaft with two No. 10 Cameron's. These being unable to handle the water, three Emerson pumps, two 4-in. and one 5-in., were expressed in and placed in the hoist shaft. They were unsatisfactory, due chiefly to the high lift and to the wet steam, so another No. 12 Cameron pump was put in and the Emerson pumps removed. It was found necessary, however, to add more pumps before dependable progress could be made, and the final water-handling outfit required to lower the water so that the big Jeanesville in the pump chamber in the mine could be recovered consisted of two No. 12 Cameron's, three No. 10's and a Wineman pump, about the size of a No. 10 Cameron.

The lost Jeanesville was finally reached on the 24th day of January and on the 30th the water was lowered so that new valves could be put in. The sump was promptly drained and the additional Jeanesville, as well as the No. 12 Cameron, were at once put in running order, the plug shot out of the bore hole in the hoist shaft, and sinking resumed. Throughout a 60-ft. section or from a point 15 ft. above to 45 ft. below the largest feeder of water the shaft was timbered with sets and lagging, and a ring placed at a depth of 175 ft. from the top. In the balance of the shafts, buntons to support the guides were hitched into the ribs. This later, however, proved a very unsatisfactory construction. The entire operation of pumping the drowned shafts took six weeks, from 1500 to 2500 gal. of water per min. being handled continuously; there was also the constant changing and lowering of the pumps. The hoist shaft was bottomed on June 4, 1907.

The Design of a Lining

From this brief history, the extreme conditions which had to be taken into consideration in the design of a lining are probably clear. It was deemed advisable to plan not only for the hydrostatic head equal to the depth of the new shaft to the ring below the first impervious stratum, which was practically 170 ft., but to reinforce for the pressure of the grout which would be necessary to drive back the water which itself would be under the pressure due to this head when prevented by the lining from entering the shafts. In the actual grouting this was not found to have been absolutely necessary, although the extra cost of reinforcement was good insurance.

Below the ring the lining was designed to withstand only the pressure which it was figured would accumulate and possibly bank up, as it were, between two or three other impervious strata. It was necessary, therefore, to design and construct the lining heaviest at the ring in the hoist shaft and to reduce the amount of reinforcement gradually, as the lining was constructed up from this point. Below the ring, local conditions as they were uncovered in the actual operation of lining were to govern the placing of the reinforcement.

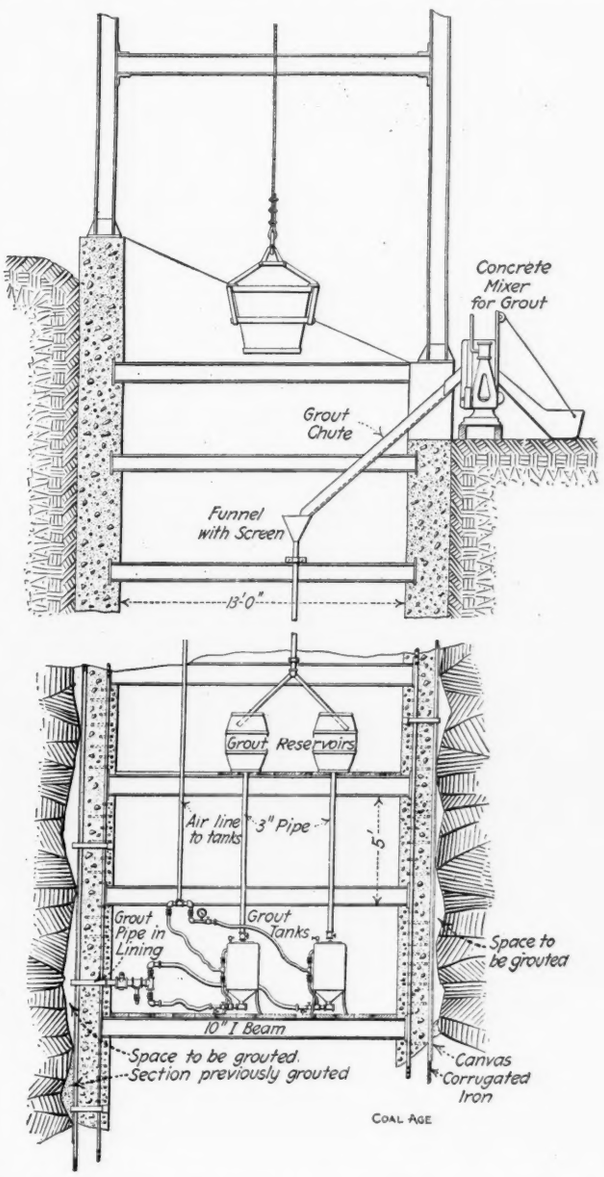


FIG. 3. VERTICAL SECTION OF SHAFT, SHOWING GROUTING APPARATUS

The design of a reinforced lining for a shaft is fortunately governed by natural conditions which determine the placing of the steel. Although the shaft sinker attempts to drill and load the shot holes so as to have the rock break to a certain line, the rib is usually so shattered that it presents a very irregular surface. In lining, therefore, the concrete will be of different thicknesses at different points.

Since the lining between buntons takes the form of a

panel system, much like a paneled floor in a reinforced-concrete building, it follows that the greater the thickness of lining, the less reinforcement per foot is required. It was necessary, therefore, in designing a lining to provide for certain quantities of reinforcing steel for certain thicknesses of concrete at different depths in the shaft down to the 170-ft. point, to which it was figured the hydrostatic head would act. The accompanying drawings show the method of reinforcement and the manner in which the stresses in the panels were carried to the buntons which acted as columns.

It may be noted that a different system of reinforcement was considered before the final design was decided on. This contemplated drilling holes in the rock rib and inserting wedge bolts with loops on the outside end. These bolts were to be placed 2 ft. apart, vertically and horizontally, around the rock walls of the shaft. It was then planned to pass reinforcement through the loop holes at the end of these wedge bolts.

The concrete lining in this way would be fastened to the rock ribs and the pressure of the grout would find, of course, much shorter beams to act against. Buntons could have been made much smaller and considerably less reinforcement used, for the span of the panels would have been much smaller. But the scheme presented certain disadvantages which it was decided heavily overweighed the cheapness of the construction.

As above noted, the rock rib was so broken in structure that it was felt that an absolute certainty of the strength of the construction could not be depended upon. Again, the corrugated iron and canvas backing to the lining was deemed an essential feature and, as later proved, was a very necessary one. This could not have been placed around the wedge bolts to completely shed the water with any certainty. Again it was felt that directly underneath the bolts there might be possibly a small channel which would lead the water from the rock rib to the line of reinforcement which would be about 2 in. from the inner or shaft face of the concrete. In this case, it would have been impossible to prevent the lining from leaking. The cheaper scheme was, therefore, discarded on account of its uncertainty.

The biggest feature of the lining as finally constructed was the iron and canvas backing. The canvas was placed, as noted in Fig. 4, so that the grout would be forced into the weave of the cloth and so form an impervious mat behind the actual concrete. The sheet iron formed a stiff drainage channel to conduct the water from the rock behind the lining.

After the minimum thickness of concrete lining had been decided, the necessary enlargements of the shafts were determined, costs estimated, and contracts for the work were closed with the Dravo Contracting Co., of Pittsburgh.

Actual Construction

The hoist shaft was turned over to the contractors about the first of August, 1913. The shaft bottom was found to be in such shape, however, that concrete arching for a distance of 20 ft. on each side of the hoist shaft was deemed advisable, and the work of the excavation therefor and the cleaning out, widening of entries and the taking down of roof necessary for this arching were commenced. Due to certain other bottom work which the coal company wanted the contractors to do, the actual lining of the shafts was not started until Oct. 18.

The routine of the work of lining was as follows: Guides and hitch buntons were removed for a distance of, say 15 or 20 ft. The shaft section was then enlarged, the drilling being done with Sullivan DB-19 hammer drills and Ingersoll jackhamers. After the rib was shot and trimmed, the muck was removed from the scaffold and a set of concrete forms placed. These forms were made in sections to cover five vertical feet of shaft. They were dapped at bunton points to permit the placing of the steel H-beam buntons.

After the forms were braced to line and level, the corrugated iron and canvas backing was hung, directing the course of the water from the rib at the section of concrete to be placed to the drainage channels behind the section of lining last poured, which water would then flow out through grout pipes which connected the drainage channels to the concrete forms. The reinforcement was then put in place, according to the plans applying to the depth and according to the thickness of the lining at that point. After cleaning the top surface of the section of concrete previously placed, removing the keys in the old concrete and covering the surface with cement grout, the pouring of the concrete was started.

After the section was poured, scaffolding in the center was piled to the sides and the men went to the lowest section of forms which had been left in place and dismantled and brought it to the surface, where it was repaired and coated with an oily preparation to prevent the concrete sticking when it was next to be used. The cycle of work to prepare for the concreting of the next form was then resumed.

The work was interrupted at several times by certain operations of the coal company, which were necessary to its interests. These various interruptions caused a total delay of probably a month and a half in the completion of the hoist shaft. It required on an average two days to perform all the operations incident to the placing of a 5-ft. section of lining. Toward the top of the shaft, 25 vertical ft. of concrete were placed per week, while from the ring up through the wettest section, a 5-ft. form of concrete often required three days. The construction of temporary water rings and the placing of a box at the main feeder which acted as a funnel and connected to a pipe in the shaft leading to a motor-driven centrifugal pump at the bottom required especial care and considerable time.

The concrete was thoroughly spaded to remove all air bubbles and their consequent voids. The importance of well worked concrete was so impressed on the shift bosses, and the actual placing of the material so watched by the superintendent personally that at no joint in either shaft did the concrete leak, even in the wettest sections. To the actual thoroughness with which the men did their work is attributed the biggest measure of the success of the proposition.

The water was of such fine quality for drinking purposes that it was suggested that it might be possible to save some of it by running a 6-in. pipe in the concrete lining vertically from the box at the large feeder to the top of the shaft, it being the intention to place a deep-well pump therein. The pipe was placed but, as it developed later, the grouting forced the water supply so far from the bottom of the pipe that none entered it, and the scheme

had to be abandoned. After the lining was completed and the guides placed in the hoist shaft, the grout pipes that were making water were piped to the sump, the pipe being laid close to the concrete lining so that the cages could be operated.

Since the rock was so broken that the crevices in the strata connected the two shafts, it was decided to line the air shaft completely before attempting to grout the hoist shaft. The work here required no unusual methods or schemes that were not employed in the hoist shaft.

Grouting Operations

On the completion of the air shaft, preparations were made for the grouting of the hoist shaft. This latter with its grout pipes connected and leading to the sump had been in use by the coal company for four months for reconstruction work in the mine. A small motor-driven fan had been rigged up in one of the entries at the bottom and provided air for a limited operation of the mine while the contractors were working in the air shaft.

The lining was figured to stand the pressure for a 100-ft. hydrostatic head, that is, the plug cocks on the grout pipes for the 100-ft. section of lining could be completely shut while the grouting operation was proceeding at the bottom. However, to make assurance doubly sure the lining was grouted in much shorter sections.

The grout tanks which were arranged in connection with the mixer as shown in Fig. 3 were placed at the hole to be grouted. They were connected in a battery of two and were filled from barrels placed on a scaffolding just above, which barrels in turn were filled by pipe from the grout mixer at the top of the shaft. This was a new departure in shaft grouting and the arrangement was responsible for a speed of at least three times that attained by the old method. Speed was one of the most important requirements, since the coal company had only a limited supply of fuel for the boilers and had this been exhausted it would have been necessary to ship in coal from other mines or to interrupt the work of grouting in order to mine it. The arrangement of pipes, tanks and grout machines, worked admirably in every case.

The first operation in the grouting was to put a pressure gage on the hole to be treated. This would indicate the approximate pressure required to force grout into the hole. The tanks were then connected to the hole and grout forced in under the figured pressure, especial care being taken to see that this did not run over the limiting pressure for which the lining was designed.

Grout mixed to the consistency of a thick cream was forced into the hole until it commenced to run out of the hole directly above the one being treated. However, if the hole showing the grout was only 5 or 10 ft. above the one being grouted, the plug cock on the upper hole would be closed and the process continued until grout appeared in the hole next higher in the shaft. Grouting would then be discontinued, the machines raised to a higher level and connected to the hole last showing the grout. The operation was then continued in this manner until the entire shaft had been treated.

It was necessary on several occasions to come back to old holes and to regrout leaks around the pipes, doubtless caused by shrinkage in the cement. Such leaks required double the pressure that the initial grouting took, but the lining was amply strong to stand loads of this kind, for the force of the regrouting was, of course, expended over only a small area behind the lining. In the case of the original grouting, the pressure would be exerted over a large area, since the drainage channels always made a big void between the lining and the rock. The grouting in the hoist shaft required practically 1350 bbl. of cement and was completed in about 12 days.

On Sept. 14 the grouting in the air shaft was started. No unusual difficulties were encountered in this shaft, although a higher pressure was required. It was the intention of Mr. Bertolet to save a portion of the water from the air shaft for town purposes. Accordingly, the shaft was grouted up to the point of greatest water influx and the grout tanks moved to a much higher position in the shaft. The strata, however, were so broken up that although the lining at the upper point had been bonded

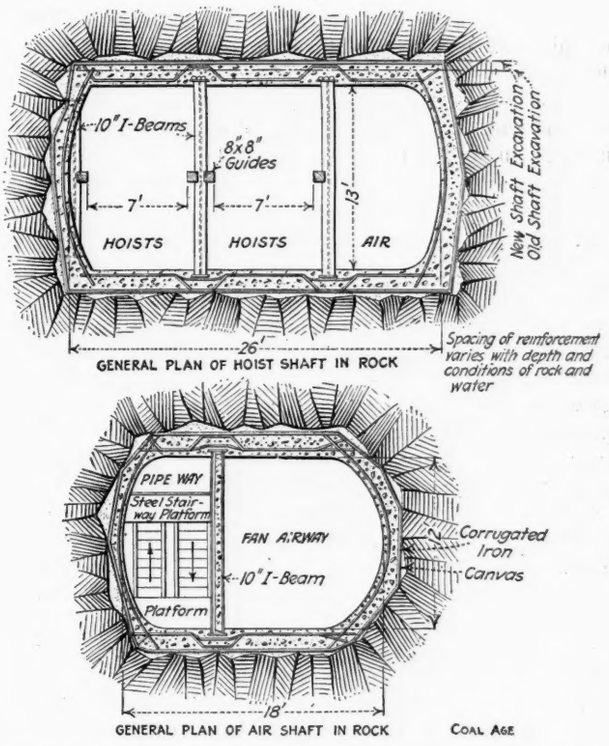


Fig. 4. Cross-Section of Air and Hoist Shafts, Showing Method of Reinforcing

to the rock rib, the grout came down through the rock and appeared with the water which it was intended to pipe to the town supply tank. The effort to save this supply was then abandoned and the shaft completely grouted. The entire operation of grouting the air shaft required only four days, in which time 1129 bbl. of cement were forced into the rock crevices behind the lining.

A pressure of 50 lb. per sq.in. is low for ordinary grouting operations in rock, or even if applied through the linings in a circular tunnel or shaft, but when it is realized that the pressure on the back of this lining amounted to 3½ tons per sq.ft. on a flat-sided shaft, it must be readily seen that the extreme care used in placing the lining and in watching the pressure of the grout tanks was more than justified.

It was even figured that the concrete on the lower side of the reinforcement, considering a section of lining as a beam, should be allowed to crack in order that the rein-

forcement might take its full load. However, there were no cracks perceptible when the lining was completed. This was unquestionably due to the fact that the shaft was grouted in shorter sections than was contemplated when the design was made. It was known and realized from the start that these extra precautions had to be taken. While the picked crew which was brought from shaft regions of western Pennsylvania at the very start of the job were the ones who saw the work through to completion, it was, nevertheless, apparent that the placing of reinforcement in such a place and under such conditions could not conform accurately to the positions noted on the drawings.

Some mining engineers are dubious regarding the question of grouting in shafts, believing that the water which is so shut off will come eventually into the mine. Local rock conditions must, of course, govern this. If there are impervious strata 50 ft. or more above the coal, the chances are that water grouted from the shafts above this point will not enter the mine. In this section, or near Welch, W. Va., there is a fairly solid stratum above the coal, but the upper rocks are much more broken in structure than in other sections of West Virginia. There have been high falls of roof in the Jed mine, now called by the present owners "Havaco Mine"; yet the water which was grouted off from the shafts has not come through into the workings.

The Pumping Now Required

Two 500-gal. centrifugal pumps were required to handle the combined shaft and mine water just before the grouting started. Now, one 500-gal. pump, running only a part of the time, readily ejects the entire flow which, of course, now comes only from the mine itself.

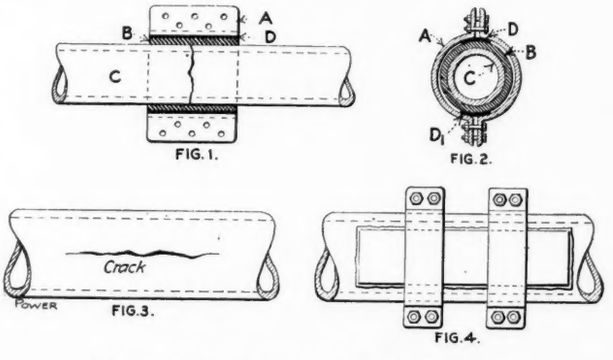
The wisdom of such an expensive piece of construction for the sole purpose of shutting off 600 gal. of water per min. might possibly be questioned, but pumping costs and the saving of the delays and incidental inconveniences due to handling coal in a wet shaft bottom are the best answers to such arguments. The saving in actual horsepower formerly required for pumping will alone pay 10 per cent. on the cost of the actual lining and grouting. Of course, there are other distinct advantages in having an absolutely dry shaft other than the saving of actual boiler horsepower in pumping. The forming of ice on the guides in the winter time under original conditions was a constant source of danger, delay and expense, and unquestionably the amount lost because of such delays would pay the interest on the cost of the incidental construction which the coal company added to the shafts. These took the form of an extra-heavy steel stairway, a concrete partition wall in the air shaft, and concrete arching at the shaft bottom.

The scheme above described was designed by and its execution carried out under the supervision of the writer, with Maurice H. Rupert as superintendent in active charge of the work on the ground.

If a current of electricity flows through any conductor, a certain definite portion of the electrical energy supplied will be required to overcome resistance and transmit the current between any two points along the path. This energy of transmission, as it is called, is never lost, but is converted into heat. Heat will be developed whenever any electric current flows through any conductor or part thereof, the amount being directly proportional to the resistance of the conductor and to the square of the current.

Repairing Pipe Leaks

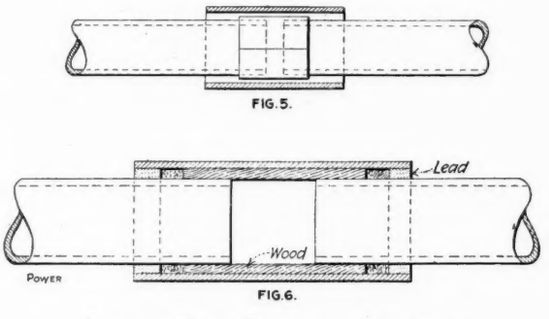
I have found the following repairs successful, says James E. Nobel, in *Power*. A 4-in. cast-iron pipe broke apart under a building foundation. To enable us to turn the water on again as soon as possible, I used the clamp *A*, 6 in. wide and ¼ in. thick (Figs. 1 and 2), with sheet-rubber packing wrapped around the pipe, and two pieces of sheet copper *D* and D_1 6 in. wide, where the edges of the clamp came together. This job was done seven years ago and is still giving satisfaction.



Methods of Clamping Broken Pipes

Another 6-in. cast-iron water pipe had a 15-in. crack, Fig. 3. A piece of ¼-in. iron 4 in. wide formed to the shape of the pipe, with sheet rubber placed under it, was clamped over the break, Fig. 4. This has also proved successful.

A 3-in. steam pipe leaked at the flanges, because the threaded ends were badly corroded. A copper sleeve and a 5-in. pipe 8 in. long were slipped over the opening after the flanges were removed, Fig. 5. The space between the outside of the 3-in. pipe and the inside of



Joining Pipe Ends with Sleeves

the 5-in. pipe was then filled with Smooth-On, iron and elastic cement mixed. Heat from a blow torch was then applied for half an hour, and in two hours steam was turned on.

In extending a cast-iron water main it was found that what should have been the connecting length was a foot short and there was no more pipe of the same size on hand. Instead of sending to the city for a pipe and sleeve, one of the men went into the workshop and in a few minutes turned out a wooden sleeve 16 in. long to fit over the pipe. Next a 20-in. piece of larger pipe was cut and placed over the pipe ends and the wooden sleeve, Fig. 6. The joint was then run with lead in the usual way.

A Successful Automatic Gate

By H. M. Kanarr*

SYNOPSIS—A device is driven by the hoisting engine, which opens the shaft gate at the ground landing when the cage is stopped there. It also prevents over-winding, shutting off steam and applying the brakes when a predetermined point in the headframe is passed.

An automatic gate, designed to protect the ground landing of a hoisting shaft, which has been invented and patented by I. J. Harvey, a division superintendent for the Rochester & Pittsburgh Coal & Iron Co., is being tried out at the Sykes shaft of the Jefferson & Clearfield Coal & Iron Co., at Sykesville, Penn. Thus far the device has proven entirely satisfactory.

This particular device is operated by compressed air, although it might be steam driven were the air not available. The controlling mechanism, which is mounted on a small frame adjacent to the hoisting engine, is driven from the main drum shaft through a sprocket wheel and chain. The speed of the engine and the depth of the shaft determine the relative gear ratios of the two sprocket wheels.

The engine, in hoisting, rotates a rod about 1¼ in. in diameter and 3 ft. long, on which is cut a special screw thread with a pitch of about one-half inch, the rod thus making two revolutions per inch of travel of the screw thread. This screw operates a slide which is mounted on a small rod just below and parallel to it.

At one point in its travel, this slide comes in contact with and depresses a lever for opening the valve which admits the compressed air into a cylinder standing vertically against the front wall of the engine house. This cylinder is approximately 8 ft. long, and is made from a 6-in. pipe. A piston or plunger operates within it, which is connected with the gate at the shaft by means of a wire rope passing over suitable sheaves. The gate slides up and down on two 2-in. pipe guides, the vertical travel of the piston in the engine house being just sufficient to raise the gate the distance required for car clearance.

When the cage does not stop at the lower landing, the slide passes over the operating lever so quickly that only a small amount of air is admitted to the cylinder, an amount insufficient to cause any piston movement. When a stop at this landing is made, however, the lever is held open by the slide, and the air in the cylinder holds the gate suspended until the cage is moved, when the slide releases the lever to its normal position, which, in turn, releases the piston and the gate descends. A short helical spring on the piston rod cushions whatever shock may be caused by this action.

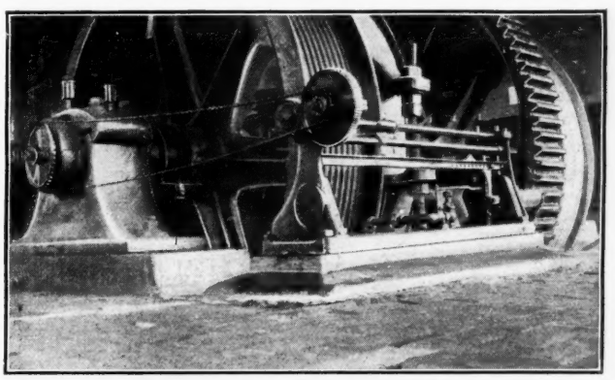
Over-Winding Is Prevented

In addition to operating the gate as above described, this device is arranged so as to prevent the cage passing a predetermined point. It thus forestalls over-winding. A small lever adjustable with a threaded nut is placed at the end of the frame on which the operating slide travels, and when the cage passes a predetermined position in the head frame, the slide comes in contact with a small lever tripping it, and thus putting the entire air pressure against a piston attached to the throttle, closing it immediately and through another piston applying the brakes to the hoisting drums. In order to move the engine again, it is necessary to shut off this emergency pressure, which may be done by suitable valves, after which the safety trigger may be again set and the engine operated as usual.

It has been found by actual test that it is impossible for the hoisting engineer to hold the throttle open against the air pressure, or to open it until the pressure has been released, while the braking effect is sufficient to stop the engine almost instantly.

The Gate Requires No Attention

The gate is entirely automatic in its operation, requiring no attention from the engineer other than to see that the mechanism is in working order and the proper adjustments made. All of the driving mechanism is in a warm room and is not affected therefore by freezing temperatures. The only part exposed is the gate, and its operation on the slides may be assured during cold weather by admitting a small amount of steam to the 2-in. pipe guides, thus keeping them absolutely free from snow and ice. The engineer can always see at a glance the position of the gate by noting the location of the piston at the front of the building.



Mechanism Controlling the Gate

The accompanying photograph shows all of the operating mechanism, except the cylinder and piston, which raises and lowers the gate. It will be noticed that in this particular case the device is arranged for a single-compartment shaft. In a double-compartment shaft, two screws and slides would be required. These might be mounted on the same frame and driven by the same sprocket. Two cylinders and pistons would, however, be necessary.

Gates similar to the above have been installed at the Stanley shaft of the Rochester & Pittsburgh Coal & Iron Co., at Helvetia, Penn., and at a double-compartment shaft of the same company at Lucerne mine near Homer City, Penn.

*Chief engineer, Rochester & Pittsburgh Coal & Iron Co., Punxsutawney, Penn.

The Value of Anthracite Steam Coals

By Reginald Trautschold*

SYNOPSIS—A study of some economic considerations in the use of the anthracite steam coals. The actual heat values fluctuate according to delivered prices and hence vary in different sections of the country. Grate bars should also be designed with a view to further increases in the cost of coal.

With rice coal at two dollars the ton, buckwheat a dollar more, pea still another extra dollar and nut probably two dollars more than pea—each one an excellent steam fuel—the selection of the most economic anthracite to burn in any plant is a question surrounded by varying difficulties. The cheap smaller coals are harder to burn economically, lower in heating value and contain considerably more ash and refuse than do the more expensive grades. There are disadvantages or drawbacks on one side of the equation and dollars on the other. The steadily increasing cost of anthracite coals is also continually

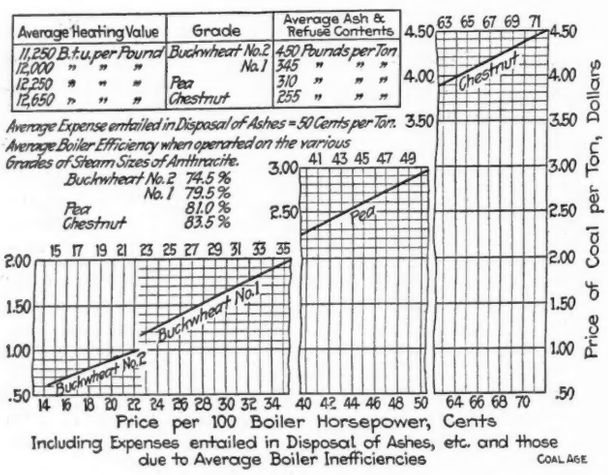

Average Heating Value
Grade
Average Ash & Refuse Contents
11,250 B.t.u. per Pound
12,000 " " "
12,250 " " "
12,650 " " "
Buckwheat No.2
No.1
Pea
Chestnut
450 Pounds per Ton
345 " " "
310 " " "
255 " " "
Average Expense entailed in Disposal of Ashes = 50 Cents per Ton.
Average Boiler Efficiency when operated on the various Grades of Steam Sizes of Anthracite.
Buckwheat No.2 74.5 %
No.1 79.5 %
Pea 81.0 %
Chestnut 83.5 %
Buckwheat No.2
Buckwheat No.1
Pea
Chestnut
Price of Coal per Ton, Dollars
Price per 100 Boiler Horsepower, Cents
Including Expenses entailed in Disposal of Ashes, etc. and those due to Average Boiler Inefficiencies
COAL AGE

Chart I, Showing Costs per 100 Boiler Horsepower

upsetting the balance of the equation, so that the economical coal of yesterday may not be the cheapest today. To complicate the problem still further, the economic balance is not the same in all localities.

Irregularities in Values

At the mines, the relative value of the various sizes of anthracite has not varied as much as at points requiring long rail hauls, etc. However, culm and barley have acquired a certain value since the not very remote days when they were practically worthless, or worse, while the larger coals have increased in cost fairly proportionally, the price being regulated by cost of production and by the demand. Within range of wagon or automobile delivery from the mines, the economic value of the anthracites varies inversely with the size. That is, the smaller the coal, the greater the heating value obtained for a given outlay.

The relative economy does not, however, necessarily vary with the price of the coal nor its heating value, at least it does not vary directly. While the heating value increases with the size of coal—considering only the washery sizes and the smaller prepared sizes—it must also be remembered that the ash content and other refuse decrease in proportion as these coals advance in size. These dilutants not only necessitate an expenditure for their removal, but have a tendency to reduce the boiler efficiency of the plant. The greater the proportion of ash, the more that has to be expended for its disposal and also the lower the thermal efficiency of the boiler, even though the different sizes of coal burned do contain the same heating value. The ash and refuse contents of any fuel tend always to reduce the transfer of heat to the boiler. The effect of these noncombustibles is not so marked, on account of their relatively small proportion, as the benefits derived from increased heating value, but they must nevertheless be considered if economic efficiency is to be realized in the choice of fuel.

The Steam Sizes and the Basis of Comparison

Any grade of anthracite, even culm, can be burned so that it has a certain heating value, more or less constant for standard sizes of coal, and correspondingly an economic value, which latter is governed by its heating value, ash and refuse contents. Culm and barley do not lend themselves to efficient use, however, without briquetting or pulverizing, operations which add materially to the cost of the fuel. Though anthracite briquettes do prove economical when the proper binder is employed and the combustion of coal dust has been successfully and profitably undertaken, neither of these two methods of utilizing low grades of anthracite comes under the scope of this discussion.

Rice, or buckwheat No. 2, can be successfully and economically burned on grates especially designed for such fuel, buckwheat No. 1 is rapidly becoming a standard size for power purposes, pea is, of course, the recognized standard steam coal among the anthracites and chestnut is an excellent, though costly, steam fuel. These four standard grades of hard coal may then be considered as embracing all the anthracite steam fuels and their relative economic value for power purposes will be taken up, both at the mines and at a market comparatively distant from the source of supply.

A convenient base for comparing the value of coals as steam producers is the quantity required to develop the necessary heat for 100 boiler hp. with a boiler efficiency of 100 per cent. A boiler horsepower is equivalent to 33,317 B.t.u. per hr., the heat required to convert 34.5 lb. of water into steam from and at 212° F., or practically equivalent to an evaporation of 30 lb. of water from 100° F. into steam at 70 lb. gage pressure. If all grades of coal could be burned with equal efficiency—that is, if the boiler efficiency were the same for all grades of fuel—

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the economic value of the various grades would vary according to their heating value. But there is frequently considerable difference.

For instance, the average heating value of buckwheat No. 1 is about 6⅔ per cent. greater than No. 2, while the ash and refuse contents of the former average something like 21 per cent. less. Therefore, the average efficiency of a boiler with grates designed for the use of buckwheat No. 1 would be nearly 7 per cent. greater than a similar boiler fired on rice, the same care and efficiency being employed in burning the two grades of fuel and the respective grates equally well proportioned. At the mines or in localities where coal can be purchased at similar rates, this variation in boiler efficiency and the additional expense entailed in disposing of the greater quantity of ashes and refuse from the poorer grade of coal mean that though buckwheat No. 1 costs nearly 100 per cent. more than rice, its net cost per 100 boiler hp. averages

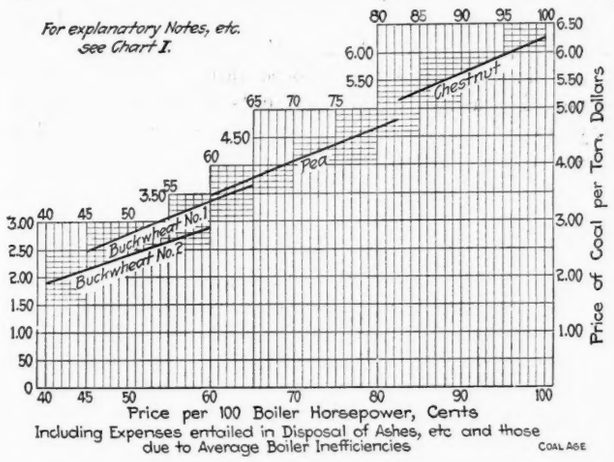

For explanatory Notes, etc. see Chart I.
Chestnut
Pea
Buckwheat No.1
Buckwheat No.2
Price of Coal per Ton, Dollars
Price per 100 Boiler Horsepower, Cents
Including Expenses entailed in Disposal of Ashes, etc and those due to Average Boiler Inefficiencies
COAL AGE

CHART II, SHOWING COSTS PER 100 BOILER HORSEPOWER AT NEW YORK

but about 75 per cent. more. Other grades of steam sizes of anthracite are affected in a similar way.

VALUE PER BOILER HORSEPOWER ON MINE PRICES

Based on mine prices, Chart I graphically depicts the net cost of the various grades of anthracite per 100 boiler hp. with coal commanding different prices per ton, due allowance being made for expenses entailed by the presence of ash and other refuse and the losses due to thermal inefficiencies of the average boiler when fired on the various grades of coal. The chart shows that there is a fairly uniform relation existing between the prices of coal at the mines and its cost per power-generating unit, and that the better the coal, the less economical it is for steam-producing purposes, its cost per ton increasing about 50 per cent. more rapidly than its steam-generating power; the chart also indicates the limiting prices that can be economically paid for various grades.

As as example, should rice command a price of $1 per ton and if at the same time buckwheat could be purchased for $1.15 per ton, the higher-grade coal would be the more economical, although containing but 6⅔ per cent. more heat units per pound. Such conditions could not arise at the present rate at which coal is sold, but such rates are not impossible if the progress in efficient burning of rice continues as rapidly as it has during the past few years. The price of buckwheat is regulated almost entirely by demand and not the cost of preparation, which is little or no more than rice costs. If the numerous power houses now fired on buckwheat should modify their grates so as to burn rice instead, a step that at present would effect considerable saving, the price of the poorer grade of coal would go up rapidly and the decreased demand for buckwheat would result in its becoming cheaper so that their respective costs per ton might fall to a difference of 15 per cent. instead of nearly 100 per cent. as at present.

At a distance from the mines the relative value of the small sizes of anthracite may differ considerably from the mine prices; freight and delivery charges have to be added and these are not governed by the heating value of the coals but are based upon weight. Freight rates do vary according to the grade of coal, it is true, being less for the poorer qualities; but delivery charges do not, so that the average price of coal delivered at the power house at a distance from the source of supply bears little relation, so far as the true economic value of the coal is concerned, to the prices current at the mines. Take the New York market, for instance—the average price of buckwheat, delivered, is about 40 per cent. greater than rice, while the average difference at the mines is nearly 2½ times as great. This naturally has considerable effect upon the relative value of the various grades, often reducing the difference to a considerable extent.

VARIATIONS ACCORDING TO FREIGHT BURDENS

Regarding the freight and delivery costs as fixed charges, just as if the price at the mines had been increased by an equivalent amount, a chart may be plotted to embrace the range of prices through which the various grades of coal may pass and the cost of the coals per 100 boiler hp. for any locality where the market prices fall within its range can be shown. Such a graphic illustration is given in Chart II, covering the range of prices that may be expected in New York; similar charts are equally applicable to any other locality where prices are the same. In such sections of the country the gap between the minimum possible price for pea and the maximum for rice is well overlapped by the average prices of buckwheat and not simply connected by the minimum and maximum prices as at the mines.

Three grades of coal are thus brought within a possible equal value for steam purposes—rice at about $2.87, buckwheat at $3.35 and pea at approximately $3.48 per ton, all being equally economical. At the present time (October, 1914) pea commands more than this figure and rice is obtainable at a better price. Buckwheat has already, or may before long, be counted upon to touch this figure, $3.35 per ton delivered, and the time cannot be far distant when many plants, now operating with pea, will find it to their decided advantage to burn buckwheat and others that now burn buckwheat to fall back on rice. With buckwheat at $3 per ton, it would be economical to remodel a plant so as to operate on rice, provided the latter costs less than $2.65 per ton; and similarly with pea at $3.75 per ton it would pay to use buckwheat at $3.60 per ton.

The foregoing comparisons apply only to localities where the average prices are about the same as in New York. Where anthracite is more expensive, the range of economical coals is greater and the gain derived from abandoning the use of a certain grade for one of poorer

quality is not so marked. The nearer the source of supply the greater the economy of using a low-grade product.

The charts presented herewith are based on coals of average heating value, reasonable ash and refuse contents, burned under boilers of ordinary efficiency, and the fuel costs per 100 boiler hp. represents values that can be counted upon with efficient operation. They may be bettered, of course, but if they are not fully realized, the coal used is below specifications or else the boiler efficiency is not what it ought to be. Should better efficiencies or higher heating values than those on which the charts are based be obtained, very close fuel costs per 100 boiler hp. may be arrived at by interpolation of the chart readings, such calculated values being accurate enough for all practical purposes.

Effects of a Slight General Increase in the Cost of Coal

Two general rules may be laid down as to the economic value of anthracite for steam generation in the power house: First, the lower the price of anthracite, the poorer the grade of coal (smaller size) that can be advantageously used, and *vice versa*. Second, in selecting grates for new plants or in the remodeling of old ones, it may be advisable to install grates for the grade of coal poorer than the most economical grade at the time of installation, if the economic values of the two coals do not vary greatly. This allows for an increase in the price of all grades of anthracite, which must be expected, and an increase has less effect on the fuel cost per boiler horsepower when cheap coals are employed than with a more expensive, though more efficient, grade.

In a locality where buckwheat commands a price of $2.80 per ton at the time of installation of grates, and rice a price of $2.40, it would be good policy to install grates for burning rice, although for the time being buckwheat would prove the more economical coal. A 10 per cent. increase in the price of the two grades, which would not be at all improbable, would reverse their relative economies. With rice and buckwheat commanding $2.80 and $2.40 per ton, the fuel costs per 100 boiler hp. would be 49.6c. and 50.1c., respectively; but with buckwheat at $3.08 and rice at $2.64, the fuel costs would be 55.2 and 54.9c. per 100 boiler horsepower, respectively, and should there be still further increases, the balance would favor rice even more.

In sections of the country where the difference in cost of buckwheat and rice is still 40c. per ton, and the price of buckwheat $3 per ton, it requires only about a 2½ per cent. increase in the prices of the coals to throw the economic balance in favor of rice.

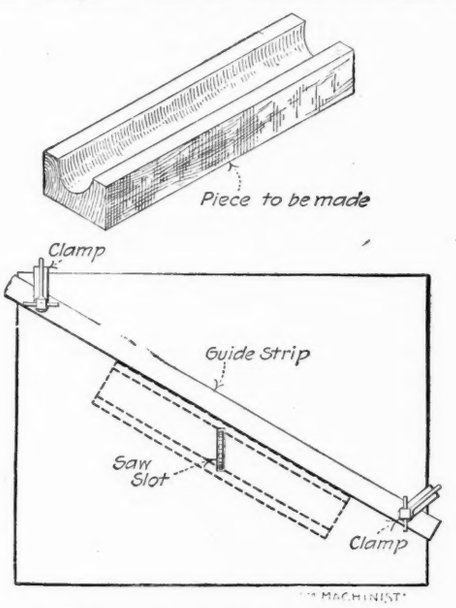
Kentucky Makes Large Gain in Mine Output

The principal mineral product of Kentucky is coal, the value of which constitutes about three-fourths of the value of the state's total mineral output. In 1913, according to the U. S. Geological Survey, the total value of the mineral production of Kentucky was about $27,000,000, of which the coal mines contributed $20,516,749. This is an increase of about $4,500,000 in value of total mineral products over the figures for 1912.

The second industry in importance, clay-working, contributed $2,914,276 in 1913, an increase of $470,536 over 1912. The quarrying industry is third in importance in the state, its products in 1913 being valued at $1,150,205, against $1,282,148 in 1912.

Sawing Elliptical Troughs

A short time ago, says Johnson Barre in *American Machinist* for Nov. 5, our wood-working department made use of the following "stunt" which, while it may be old, was certainly new to me, and may bear passing on. A number of wooden pieces had to be made about 3 ft. long by 8 in. wide and 5 in. thick, troughed out about as shown in the illustration. The curvature of the trough had to approximate fairly closely a given diameter. This curve was laid out in pencil on one end of each piece, previously dressed to the required outside dimensions. The rough stock was then removed, leaving enough to finish smoothly. A flat strip of wood, having a straight edge, was clamped across the table of a circular saw, as



Sawing Elliptical Troughs

shown, and a test piece run along this strip for a short distance to obtain the angle necessary to set the strip so that the saw might cut to the correct curve. This angle was readily obtained after a few trials, and the troughs were then easily and rapidly finished. This method is applicable only where the curve is part of an ellipse with the long axis vertical.

Where such is the case, it is rapid and accurate, as the saw can be raised after the correct angle is determined, to cut right up to the desired curve, and the trough furthermore is uniform in curvature from one end to the other.

Automatic Mine Doors in Alabama

The Republic Iron & Steel Co. is installing automatic mine doors in its Warner and Sayreton mines, in Alabama. These self-acting doors do away with trappers, and thus reduce general operating expenses. The doors are manufactured by the American Mine Door Co., of Canton, Ohio, which concern charges coal companies a rental price of $6 per month for mule doors and $7 for mechanical-haulage doors.

A New Entry-Driving Machine

By A. H. Gibson*

SYNOPSIS—This machine is virtually a powerful air-driven coal puncher with an elevator and conveyor for loading cars attached. It has been in use for about six years, undergoing development meanwhile, and is now for the first time being put on the market.

One feature of coal mining which is admittedly dangerous and undesirable is the use of explosives. The only reason for their employment and the risk entailed when they find their way into ignorant or careless hands, is economy. If, however, their use could be entirely eliminated without decrease of output or increase of cost, and without introducing other and perhaps more grave dangers, the safety of coal production would be considerably enhanced, while the occupation of coal mining would become more attractive to the coming generation.

At the present time this improvement in means and methods is applicable to the driving of entries. It is alleged that the Ingersoll-Rand "Heading Machine," "Entry Cutter" or "Cutter and Loader," as it is variously called, accomplishes this result. The machine in question is not new, having been in existence for some six years and having cut many miles of entry. It has now, however, arrived at the status where its endurance, performance and possibilities are known quantities which can be thoroughly proven on a commercial scale.

The principle and operation of this machine may be clearly understood from reference to the accompanying drawings, Figs. 1 to 4. Fig. 1 represents the device ready for undercutting. The machine itself consists of a powerful compressed-air coal puncher mounted upon a carriage and under the control of the operator. A lever elevates or depresses the puncher pick. Another lever moves it from rib to rib by means of a small air engine, while a third lever moves the whole puncher together with its truck bodily toward or away from the face, the conveyor remaining stationary within certain limits or accompanying the forward or backward motion of the puncher as desired.

The puncher itself makes about 160 strokes per minute, and is controlled in the same manner as the ordinary hand-operated machine going from rib to rib and making a cut extending the entire width of the entry.

The conveyor is driven by a separate engine suitably controlled by a stop valve, and the mine car is filled evenly by moving the same about three times during the loading process by means of the brake on the car, provided the latter is on a sufficient grade, that is, on the dip the car is stopped at the proper place to fill the end nearest the machine first, after which the brake is released, allowing the car to move down hill until the loading is complete.

Fig. 2 shows the machine and entry after the undercut is finished, and the conveyor moved into the kerf. This illustration also shows an unfilled car in place and in readiness for the process of knocking down the coal, the car being shown as it would be placed when working on the rise. Making the undercut is the longest part of the operation, requiring from 25 to 40 min., according to the hardness of the coal.

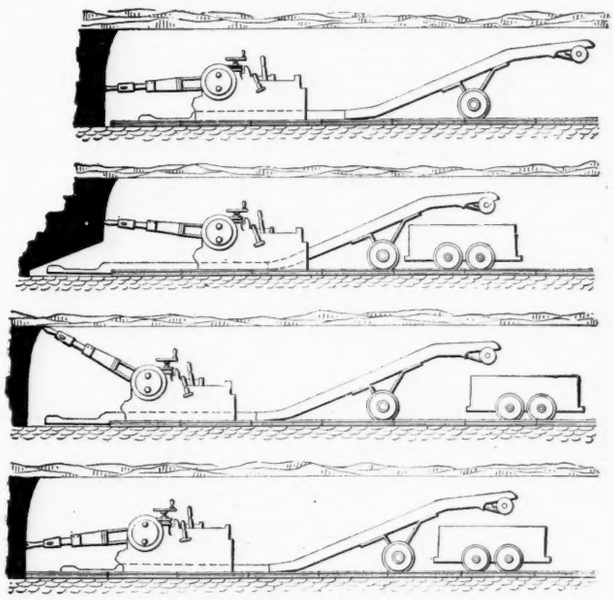
*Engineer, Phillipsburg, N. J.

Fig. 3 shows the knocking-down process completed. This ordinarily takes place faster than cars can be supplied. The next operation is to pull the conveyor back about 7 ft., lay a section of track, and move the conveyor forward to position.

Fig. 4 is the same as Fig. 1, except that the entry has advanced about 5 ft. and five to six cars of coal have been loaded out.

The Average Advance Is 10 Ft.

Two set-ups during the shift constitute a 10-ft. advance of the entry. It is estimated that under suitable



Figs. 1, 2, 3 and 4. Showing the Operation of the Machine

operating conditions, such as high coal of the quality found in the Pittsburgh seam, that the machine should average 250-ft. advance per month of 25 working days, working day shift only, night shift being reserved for the laying of tracks, piping, etc. Under actual working conditions, the advance made and the repairs show such a speed to be perfectly possible.

Two of these machines which have been in operation at the Annabelle Mine, of the Four States Coal & Coke Co., at Worthington, W. Va., have been in operation since June 1, 1913. These have been operated two shifts of nine hours each per day, and entries cut averaging 10½ to 11 ft. wide and 6½ to 7 ft. high. Where conditions have been suitable and cars have been served to the machine without delay, as much as 20-ft. advance has been made in a single shift. This condition does not, however, hold true all the time, as the machines are considerably delayed by lack of cars, but the average operation over a period of two or three months showed a progress of somewhat over 10 ft. per shift on the average.

The question naturally arises, how does this machine compare with present costs of entry driving? According to conditions, comparisons will vary somewhat, but taking into consideration the first cost of the machines, which

work in pairs, the total actual daily expense figures out favorably to the machine, everything being considered. This estimate, however, does not take into account the increased rate of entry driving, the reduced risk of gas or dust explosion, due to the absence of explosives, the fact that a straighter entry is secured, that the roof is better since there is no blasting to shake it loose, also that the ventilation is better due to the straight sides and roof facilitating the movement of the air current.

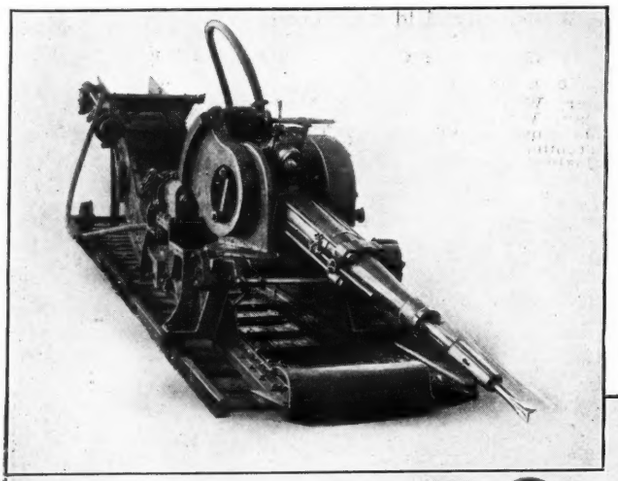


FIG. 5. FRONT VIEW OF HEADING MACHINE

A reduced risk of explosion is secured by the absence of electric arcs or sparks, and the much ridiculed but nevertheless real menace of live wires strung along the entry, which are, even under the best circumstances, a more or less imminent peril to both men and animals. The advantage of this machine is still more apparent where the roof is bad and requires timbering.

With this, as with other pneumatic mining machines, where gas collects in the entry over night, a small quantity of air may be allowed to escape from the pipings nightly, with the result that in the morning there is no gas and the air at the face is clean and fresh.

THE SPACING OF BREAKTHROUGHS MAY BE GREATER

Owing to the ventilating effect of the exhaust air from this machine and the fact that this exhaust takes place while work is being done, the distance between breakthroughs prescribed by law could be doubled without serious danger. This fact reduces this expensive deadwork about half, and allows the entries to proceed more rapidly.

The use of this machine renders possible the working of coal mines by the retreating system, which, should it become general, would effect a considerable saving of human life due to the reduction of accidents from falls of roof. Its use also secures greater uniformity and reliability in daily output than is at present common.

This machine has the disadvantage that when working on the rise a water supply is necessary, which has to be piped to the machine in the same manner as the air line twice each week. The water jet and a beam of light from a safety electric headlight follow the movements of the coal pick, both spray nozzle and headlight being mounted upon the plunger frame and moving with it. Where the entry is on the dip, the coal is usually wet and requires no water spraying.

As has been stated above, this machine has been in operation for about six years. It is, however, only now being placed upon the market. In the operation of the earlier machines, failures and breakages were frequent, and it was found expedient to redesign practically everything on the whole device, after which it was necessary, considering the previous experience, that the redesigned

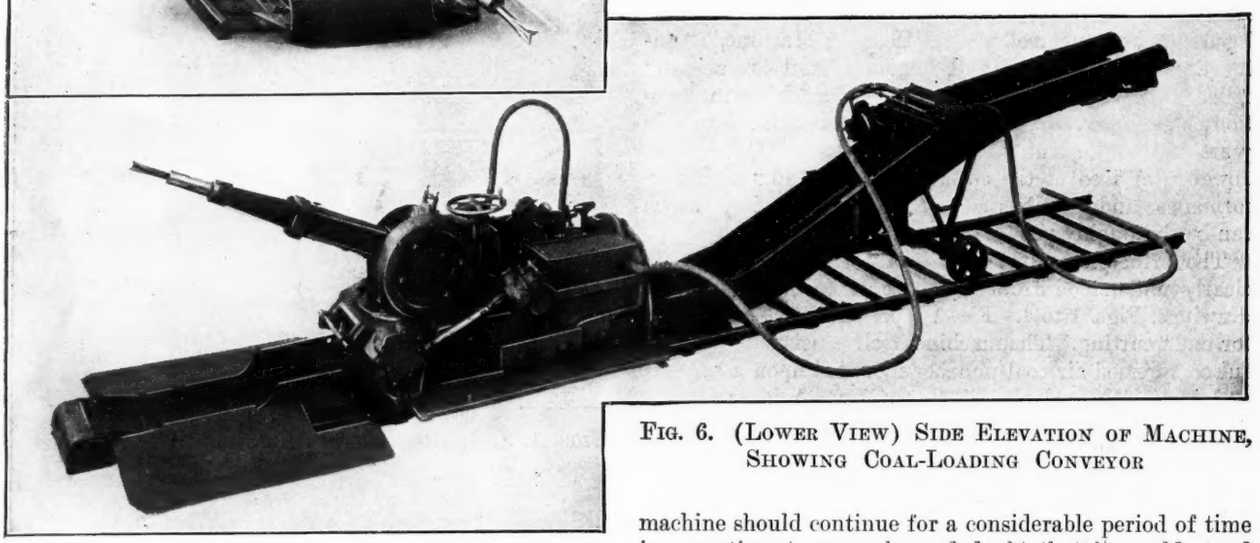


FIG. 6. (LOWER VIEW) SIDE ELEVATION OF MACHINE, SHOWING COAL-LOADING CONVEYOR

machine should continue for a considerable period of time in operation, to prove beyond doubt that it would stand up to continuous work cutting and loading coal. The success or failure of any mechanical coal cutter depends largely, if not entirely, upon its reliability of operation.

The present machine with its embodied improvements and simple working parts has gone through a severe development, resulting in a steel-inclosed, grease-packed construction, the wear upon which is bound to be extremely small. In the course of driving the several miles of entry in the various mines which this machine has cut, nothing has stopped its advance. Horsebacks have been cut through, large lumps of sulphur have been removed, the entry has been driven under treacherous roof, curves have been cut, and headings as wide as 13 ft. have been made. The machine has also been used in cutting breakthroughs, slate has been cut down and loaded. No accidents have occurred, although the work has been done in gaseous mines with gas issuing from the face most of the time. It is believed, therefore, that compared with the usual method of entry driving, namely undercutting and shooting down, the employment of this machine renders the work at once faster and safer.

U. S. Mines Bureau Trains West Virginia Miners

Mine-Rescue Car No. 8 is now traveling through the Pocahontas (W. Va.) field, along the lines of the Norfolk & Western Ry., engaged in a training tour which will embrace all the mining centers of this great coal field. Ten-day stops have already been made at Elkhorn, Eckman, Vivian, Welch and Gary, and over 100 men have received complete training in mine rescue and first-aid-to-the-injured since Nov. 10, when the training trip commenced.

General Manager Edward O'Toole, of the United States Coal & Coke Co., at Gary, is coöperating in every way with the Bureau's representatives in their present safety-first campaign at this camp, and over 50 men have received a complete course of training at Gary, where a fine mine-rescue station is already established with an up-to-date mine-rescue and first-aid equipment, in charge of Chief Chemist Vitus Klier.

Car No. 8 is now in charge of Mining Engineer D. J. Parker, from Alabama, who has just relieved Engineer H. D. Mason, Jr., who has been called to Pittsburgh as assistant to J. W. Paul, chief of the mine-rescue division.

The present intention is to extend this West Virginia training tour until July 1, taking in all the important coal fields of the state. Chief Mine Inspector Earl Henry is furthering the work of the car, as are his district inspectors, Messrs. Blenkinsopp and Lambert.

The complete itinerary for Car No. 8 along the Norfolk & Western Ry. field is as follows:

ITINERARY OF CAR NO. 8 THROUGH WEST VIRGINIA

Town	County	Dates of Training
Gary, W. Va.	McDowell	Dec. 20 to Jan. 3, 1915
Davy, W. Va.	McDowell	Jan. 4 to 10
Marytown, W. Va.	McDowell	Jan. 11 to 19
Premier, W. Va.	McDowell	Jan. 20 to 29
Coalwood, W. Va.	McDowell	Jan. 30 to Feb. 9
Berwind, W. Va.	McDowell	Feb. 10 to 18
Panther, W. Va.	McDowell	Feb. 19 to 28
Glenalum, W. Va.	Mingo	Mar. 1 to 9
Thacker, W. Va.	Mingo	Mar. 10 to 19
Matewan, W. Va.	Mingo	Mar. 20 to 29
Williamson, W. Va.	Mingo	Mar. 30 to Apr. 9
Chattaroy, W. Va.	Mingo	Apr. 10 to 19

"Buck Up"

Written Expressly for COAL AGE

By BERTON BRALEY

THIS is an old familiar phrase,
Yet one that people will forget,
Although they hear it all their days,
"—The Grumbler never got there yet!"
To groan and sigh and moan and fret
Will cure no business ills or sins,
You've got to keep your nerve, you bet,
The Booster is the chap who wins.

IF mining troubles dog your ways,
– If markets are the worst you've met,
It does no good a howl to raise
The Grumbler never got there yet!
There's no use pining with regret,
That's not the way success begins,
In spite of dullness, worry, debt,
The Booster is the chap who wins.

WHEN foolish tears bedim your gaze
Until your handkerchief is wet,
You'll fail to see the chance that pays—
The Grumbler never got there yet!
However troubles may beset,
The wise man faces them—and grins,
And conquers fate by toil and sweat,
The Booster is the chap who wins.

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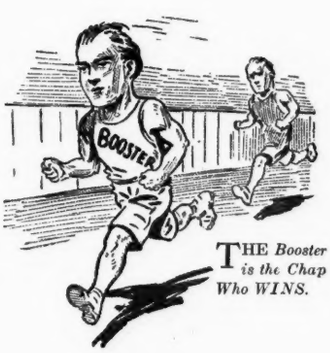
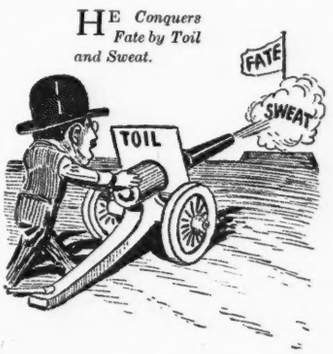


THE *Booster is the Chap Who WINS.*

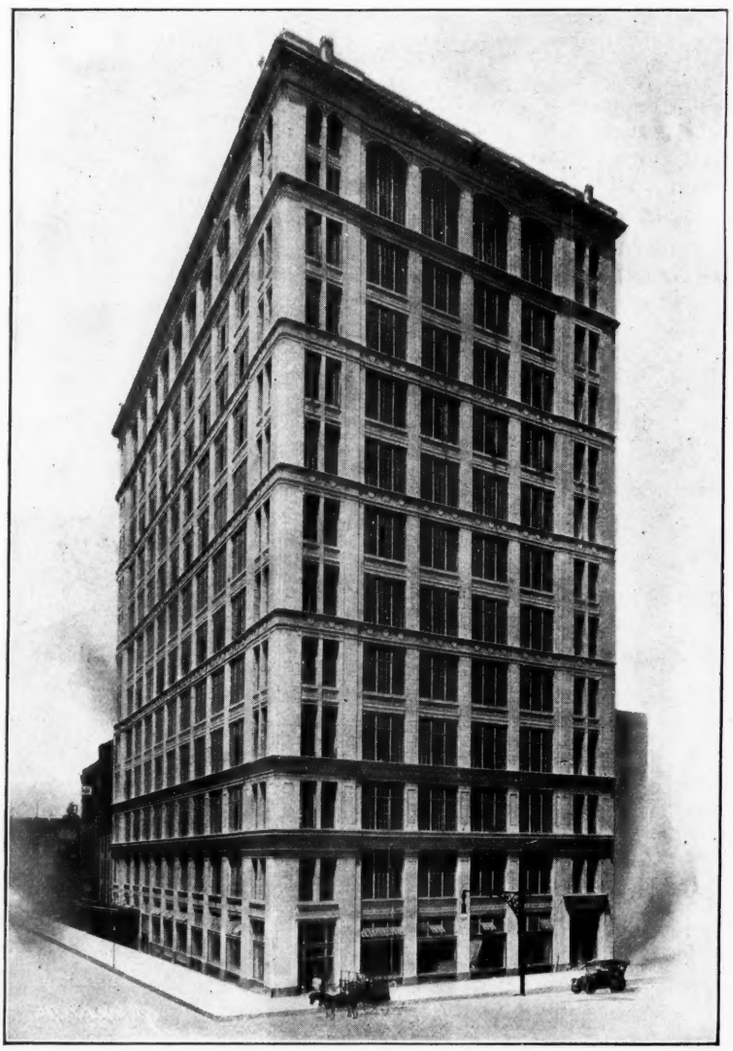
HERE IS THE MORAL, *boiled down, net;*
The Grumbler never got there yet!
And while this earthly globule spins,
The Booster is the chap who wins!

HE *Conquers Fate by Toil and Sweat.*



The New Home of Coal Age

The accompanying pictures show the new Hill Building, at the corner of 36th Street and 10th Avenue, New York City, which is the new home of COAL AGE and its four sister engineering journals. This building has been erected by the Hill Publishing Co., owning these publications, and was especially designed for their purposes. The ground area is 100x175 ft. There are 12 stories, each one 14 ft. in the clear, an unusually great height. The 12th story, where are the offices, is of double height, having a gallery along two sides. About 3900 tons of steel were used in this building, the steel framing being heavier than in any other building of its height in New York City. The permissible floor load is 300 lb. per sq.ft. The side walls are largely of glass, being approximately 70 per cent. of the total wall surface; otherwise the exterior of the building is covered with white tiling. The steel columns of the framework are protected by cement poured in from the top, 31,000 bbl. of cement being used.



THE NEW HOME OF COAL AGE

The ventilation of the building is artificial. In the basement there are three blowers capable of delivering 47,000 cu. ft. of air per min. each. These draw the air through three air-washing machines, which remove the dust and give the proper degree of moisture to the air before it is forced through the building. On the roof there are two exhaust fans, each with a capacity of 67,000 cu.ft. of air per min. There are a number of small auxiliary fans. In summer the air can be cooled, and in winter it is heated somewhat before being forced to the floors, but the main heating of the building is done by means of a hot-water circulating system.

The supply of drinking water for the building is drawn from the city mains through large filters. It is cooled in a refrigerating plant having a capacity equivalent to three to five tons of ice per 24 hours. The filtered and cooled water is distributed to sanitary fountains.

The power plant comprises three 250-kw. direct-current generators. The coal for the steam boilers is delivered to hopper bins, whence it is taken mechanically to the automatic stokers that fire the boilers. The ashes also are removed mechanically. Mechanical conveyances are to be found throughout the building for other purposes wherever necessary. Thus, between the offices and the composing room, which is on the eleventh floor, there is a pneumatic-carrier system. From the bindery, on the 10th floor, the mail bags going to the post office are dispatched to the truck on the ground floor via a spiral chute. This chute might also serve as an auxiliary fire escape in case of emergency, although the need for it is hardly conceivable.

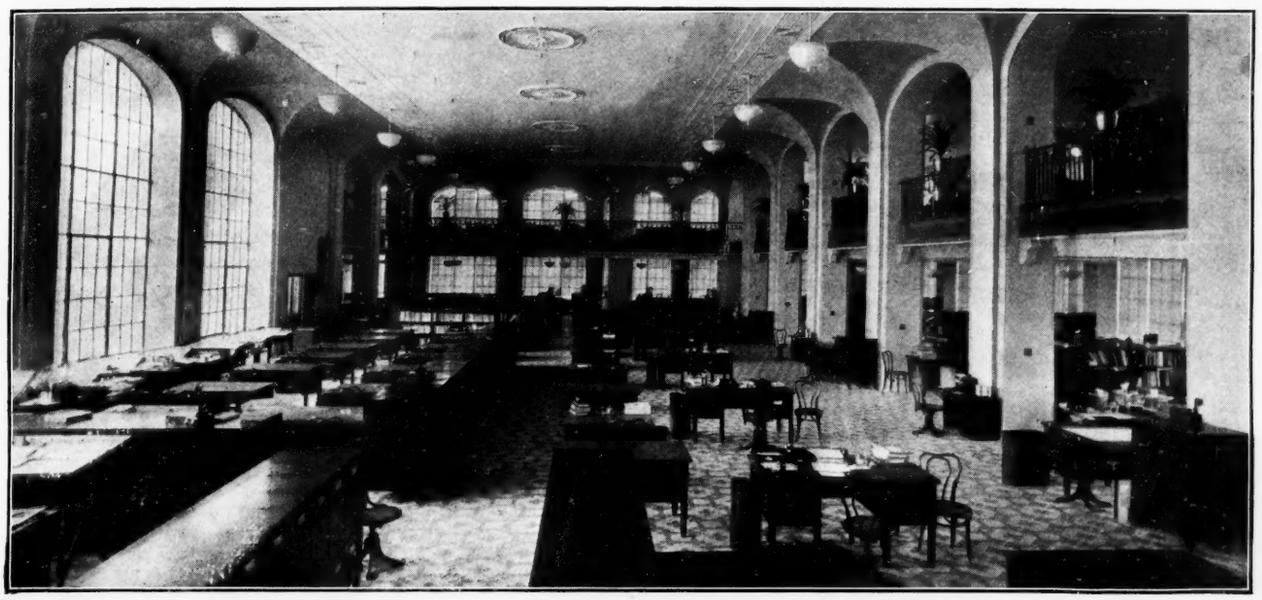
Probably no other building was ever so thoroughly safeguarded against fire. The building itself is chiefly of steel and cement. The furniture and fittings are of steel. The building is equipped with a sprinkling system throughout. There are two main stairways at opposite corners of the building. Each of these is isolated in an independent shaft, communication with the several floors being through doors that are closed when not actually in use. Besides these provisions there is an adequate fire-alarm system.

The lighting of the editorial rooms and general offices is done by the indirect system. The floors are covered with interlocking rubber tiling, which is both noiseless and durable. A noiseless typewriter is also used. With these aids toward the abolition of noise, the sounds in this large office, which is occupied by 225 persons, are scarcely more than those of a reading room in a public library.

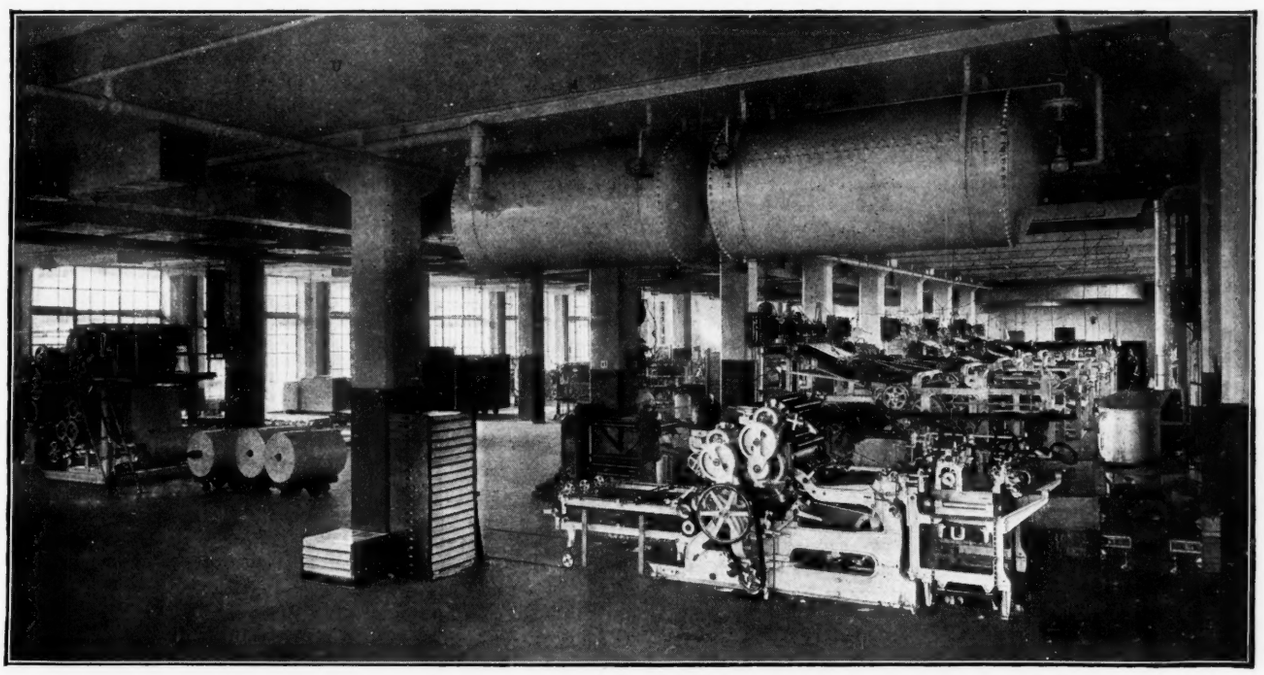
The composing room and electrotyping departments are on the 11th floor. The printing and binding departments are on the 10th floor. All of these departments are equipped with the most uptodate machinery and methods, and are supposed to exemplify the last word in printing-house-construction equipment. There are seven linotype composing machines and three monotypes. The press-room contains nine presses for the regular runs on the sev-

eral papers. The regular weekly editions of COAL AGE, *Engineering News, American Machinist, Power* and *The Engineering and Mining Journal* amount to 100,000 copies and the output of printed paper weighs 41 tons. The handling of this from the time the white paper is received in rolls to the time when the printed papers, wrapped, addressed and sorted into mail bags, are taken by automobile truck to the general post-office is as thoroughly mechanical as can be.

The floors of the Hill Building that are not occupied by the company are rented to concerns in similar or allied lines of work. Thus the floor immediately under the pressroom is occupied by the engraver who does the work for the Hill Publishing Co. The supply of paper is obtained from the ground floor. With its power plant in the basement and a restaurant for employees on the roof, this printing building is about as thoroughly equipped as anything of the kind can be. The design and construction throughout reflect the mature experience of John A. Hill, the president of the company.



GENERAL VIEW OF OFFICE, SHOWING STEEL FURNITURE, MEZZANINE FLOOR AND INDIRECT LIGHTING



PRESSROOM AND BINDERY FLOOR, SHOWING WEB, TWO-COLOR AND ROTARY PRESSES

Dr. G. Hickling, in a paper before the Manchester Literary and Philosophical Society, has shown that vegetable structures are preserved in coal in two forms: (1) In a carbonized condition, found pure in "mother of coal," quite opaque even when much less than one micron thick; (2) impregnated with the transparent material. Spores are the most readily distinguishable objects preserved in this matter, their walls being greatly swollen by impregnation.

The Labor Situation

SYNOPSIS—The federal troops are to be removed from Colorado by degrees. The eastern Ohio miners show less disposition than was anticipated to settle with the operators. They stand somewhat firmly for the Union scale. In Illinois there has been much destitution.

A conference was held by President Wilson, Governor Ammons, of Colorado, Governor-elect Carlson and Senator Shafroth on Dec. 23. After the conference, Secretary of War Garrison stated that a plan had been agreed upon for the withdrawal of troops. This was to be done slowly and the observed effect of partial evacuations would determine the rapidity with which the troops would be withdrawn.

Disturbing Pacificators to Be Kept out of Colorado

Governor Ammons advised the President not to send Seth Low, C. W. Mills and Patrick Gilday into the state just at present and declared that the investigation of the Federal Industrial Relations Committee had delayed a settlement of the strike for two weeks. He thought that the troops could be removed in 10 days after withdrawal commenced.

Col. James Lockett, in charge of the U. S. troops in the southern Colorado strike district, announced, on Dec. 23, that after Jan. 1 he would not impose any restrictions on the sale or shipment of liquor in that district.

Colorado Fuel & Iron Co.'s Beneficences

The Colorado Fuel & Iron Co. held as usual its annual Christmas entertainment, distributing candy and toys among the families of its employees. The families of those who till recently have been on strike and have now been re-engaged received presents as if no cessation of work had occurred. Unfortunately many of the families in the tent colonies cannot be given houses as there are not enough to shelter everyone.

The Colorado Fuel & Iron Co. put its new pension fund into operation Dec. 26, Frederick Darraugh, of Pueblo, Colo., receiving a pension of $125 a month which is half his present salary. He has been in the employ of the company for 33 years and is now 61 years of age. He used to be a timekeeper and has risen to the position of assistant auditor of the steel plant at Pueblo. In 33 years he has never asked for a leave of absence or taken a vacation.

No Settlement in Eastern Ohio

The proposition of the Pursglove-Maher Coal Co. to open its mines in Belmont County paying a mining rate of 58c. per ton for lump and 22c. per ton for small sizes received little attention from its men. The notices were posted the week before last and the company announced itself willing to start the mines as soon as the men accepted the proposition. Another offer of $2.84 per day for cutters and loaders was also made. Some assert, however, that the men in eastern Ohio are getting more and more discontented over the methods employed by the organization officials in handling the strike and a large majority would go to work if permitted to do so.

The action of the operators in offering the split scale as mentioned above or a payment of 44.61c. per ton on the mine-run basis, which is the Pittsburg scale, shows conclusively that they do not want to make war on the miners' union or on any one. They are sincere in saying that they cannot pay 47c. per ton for machine-mined run-of-mine coal under present conditions and that they will not open their mines on that basis. The operators engaged in eastern Ohio adhere as strongly to their position as at any time in the past and they have no intention of surrendering to their men.

Eviction of Striking Mine Workers

The Pursglove-Maher Coal Co. sent the following telegram to the officers of the United Mine Workers of America on Monday, Dec. 28.

The Pursglove-Maher Coal Co. expects rent for ten months for all its houses occupied by former employees and members of your organization or possession of its property from your men by Jan. 15, 1915. See by the papers that your funds are in such shape that you can take care of the miners indefinitely. Answer quick as upon your reply will depend our action with the civil authorities. We must have definite answer by Thursday noon. Will be at Hotel Frederick, Huntington, W. Va., Tuesday and Wednesday.

The message was signed by Joseph Pursglove, president, and T. K. Maher, secretary and treasurer. No answer was received on Monday.

Notices were prepared for service at Steubenville, O., Dec. 29, demanding that 25,000 striking mine workers in Jefferson County pay the 10 months' rent they owe the coal companies under penalty of eviction. The families reside in Warren, Mount Pleasant, Smithfield and Springfield townships and constitute a large part of those involved in the wage disagreement. The United Mine Workers of America will endeavor, it is said, to contest the eviction writs in the court. It is naturally rumored that the intention is to bring strike breakers into Ohio.

More Strike Benefits and Free Clothing

In the meantime the United Mine Workers of America through its executive boards which met at Indianapolis last week endorsed the strike in eastern Ohio and made arrangements for paying larger strike benefits. Where the money was to come from was not announced.

Senator Atlee Pomerene of Ohio has introduced in the national congress a bill to permit of the giving of 2000 discarded uniforms of the Ohio National Guard to the striking miners. When Governor Cox discussed that matter with the war department some time ago he was informed that army regulations prevented the giving of the uniforms to any one.

Poverty in Illinois Mining Settlements

Christmas this year has seen more poverty in the mining settlements of Illinois than in many years past. In Belleville, Ill., three hundred families, mostly of miners, were in need of assistance at Christmas time. In the mining section east and northeast of St. Louis, there was much poverty this year, and especially at Witt, Ill., where the Peabody mines have been idle for several months. Governor Dunne sent a Christmas present of $5 each to twenty of the most needy families there, and much assistance was rendered to others at Witt and in the mining towns adjoining.

Conditions were extremely bad at all the mining towns to the south of St. Louis, with the exception of Royalton, Zeigler and Christopher. Farther north in the Danville District, 340 coal miners, who have been idle for many months, received an order for $7.50 worth of groceries and other provisions for Christmas. The citizens of Harrisburg almost compelled the O'Gara Coal Co. to put some of its mines in operation, so as to give all its miners an equal opportunity to make a livelihood.

Frank Farrington Elected Head of Illinois Miners

Frank Farrington, of Streator, Ill., has been elected president of the Illinois or 12th district of the United Mine Workers of America. He received 22,134 votes while his opponent, Adolph Germer, of Mt. Olive, obtained 21,135, so Farrington has a majority of 999 votes. Steve Sullivan, of Springfield, received 14,136 votes. Thus it was a three-cornered fight but Farrington's greater popularity can be judged from the fact that he carried seven of his men into office including vice-president Frank Hefferly, of Collinsville. However, Duncan McDonald, the supporter of Adolph Germer, was reëlected secretary-treasurer by 26,856 votes, his nearest competitor out of the four, C. A. Sullivan, of Herrin, receiving 10,383 votes.

Frank Farrington is probably a more reasonable man than Adolph Germer. Duncan McDonald has always been regarded as an unreconcilable. It is true Frank Farrington ordered the strike in Vancouver Island from Seattle, Wash., Apr. 30, 1913. He does not appear to have had much more to do with it, and John P. White, the president of the main organization was probably as much to blame for that abortive struggle as Farrington. (See "Coal Age," Vol. 5 pp. 253, 280, 577 and 879.) Farrington was formerly on the National Executive Board for the State of Illinois.

Duncan McDonald will be remembered for his violent attacks on the president of the American Federation of Labor, Samuel P. Gompers. John Zimmerman, of Springfield, was elected to the National Executive Board.

Next Week, We Publish Our Annual Statistical Number

The Jan. 9 issue of COAL AGE will be devoted entirely to a review of the coal industry in America during 1914. The chief mine inspectors of all coal-producing states will tell us of the progress made by coal companies in their territory. Trade conditions in all important consuming centers and shipping ports will be reported by our special field correspondents. There will be a chronology of events as well as articles covering the industry's progress along engineering lines.

Don't Miss This Issue—You'll Need It For Future Reference.

Power Department

The Use of Coal

SPECIAL CORRESPONDENCE

SYNOPSIS—Any commodity is valuable in exactly so far as it fulfills a need. In order to create and foster a market for his product the coal producer should study with care the requirements of his customers.

It is usually conceded that the interests of the mine operator are supposed to cease when he has "delivered the goods" and collected payment therefor. It might be well to remember, however, that coal, like any other commodity, only possesses a value in proportion to the efficiency or effectiveness with which it meets the needs of the purchaser.

For example, a cutler might offer one of his customers a bowie knife of exceptional quality and workmanship. If that customer at the time, however, was requiring a razor, the vender's advances would probably be treated with marked disrespect. Hence, in order to successfully market the product of a mine, it is not only necessary to produce a good article, but to have an idea of what use the purchaser intends to make of the goods after he has bought them.

The advantage of this is two-fold: In the first place, much preliminary talk in attempting to sell unsuitable goods is avoided. Secondly, the vender can often point out to the purchaser methods of treatment of the goods which will enormously improve their value to him, and therefore stimulate future sales.

It is to the advantage of the coal producer therefore to study the methods employed in the use of fuels in order to be able to offer to any prospective customer the proper sizes, quality and mixture of fuel for any specific purpose, and to be in a position to point out any errors in arguments advanced by a doubtful buyer or one who is dissatisfied with what he has purchased.

In order to illustrate this position, we may take one field only in which coal is extensively used, namely, the production of steam. It is hardly too bold an assertion to say that the man who wants to sell coal should know something about the furnace in which that coal is to be burned. For example, there are furnaces in which the boiler tubes or plates are considerably removed from the grate. These are more particularly adapted to long-flaming coal which requires considerable space and time for the perfect combustion of the gases and lighter volatile elements before they impinge upon the heat-absorbing surfaces of the boiler.

DIFFERENT COALS REQUIRE DIFFERENT FURNACE PROPORTIONS

On the other hand, anthracite coals, or those containing only a low percentage of volatile matter, burn with an intense local heat, and therefore the furnaces best adapted for their use have grates comparatively close to the water-carrying boiler elements.

This is but one example of the many factors which may go to make up a customer's complaint. If a vender does not know the class of boilers and quality of coal which the purchaser is trying to combine, he may become generally puzzled at the complaints received, regarding undue repairs or low steam production per pound for coal, after his fuel has been given a tryout. If, on the other hand, he does know the probable cause of the difficulty, he may be able by a timely remark to convince a customer that at comparatively small expense an alteration may save him considerable money in fuel.

In some plants it is essential for the proper burning of the coal that the latter shall reach the furnace in a comparatively unbroken condition, and must be free from any excess of dust or slack. Other plants on the contrary are fitted with mechanical stokers for the express purpose of burning fine coal. The buyer will, of course, mention his requirements, but it is much to the advantage of the seller if he possesses a clear conception of the type of plant for which his fuel is destined.

Often the condition of the coal as it arrives at its destination depends largely upon the way in which it has been handled in transit, and where there are any particular requirements as regards freedom from dust, and two modes of shipment are possible, it may be worth while considering alternate methods to ascertain whether carriage by rail or water is likely to give the best results.

COMPLAINTS AS TO WEIGHT

Then again complaints are sometimes received as regards the weight delivered. Under such circumstances it is not ordinarily necessary either to call the colliery scales into question or to describe the complainant as a perverter of the Christian virtues. The real difficulty in such a case often lies in the weather. A variation in climatic conditions at the beginning and end of a railway journey often makes considerable difference in the amount of water contained in the coal, and therefore in the weight thereof. It may be taken as practically certain that a customer of any considerable size keeps a record of gross and net weight delivered to his power plants and it is just as well therefore that the coal owner on sending out his product should not only take its weight, but should keep some sort of record on the condition in which the coal leaves the mine.

At the present time, much attention is being paid to the calorific value of coal purchased for industrial or steam-raising purposes, and it is only fair that discrimination should be made in values on this account. In many of the larger power houses and in some of the small ones as well, samples are taken periodically of the coal as received, and these samples, after being suitably crushed and prepared, are subjected to a test for heating content and ash.

These tests, if systematically carried out, should give the average figure not only for ash and clinker, which are purely waste products, but also for the water content,

the volatile constituent, which determines whether or not the coal is free burning, and the fixed carbon which yields a steady and comparatively slow combustion. With data on these points, the owner of the power plant can, to a certain extent, determine the value of a coal from the point of view of steam raising.

Cheap Fuels May Be Expensive

It has been repeatedly demonstrated that many cheap fuels, which, however, carry a large ash- and clinker-forming content, and are consequently low in calorific value, are disadvantageous and more expensive than a higher-priced coal possessed of greater heating power. If consumers are analyzing coal, it is to the elementary interest of the coal operator that he should also take samples both of the run-of-mine and of the various grades produced, obtaining therefrom accurate figures upon the above qualities, upon which he may base his arguments when selling.

The proposition that it is necessary for a mine owner to know the plant that is consuming his product is capable of still further proof, when any particular customer is actually or is about to become a large buyer. It then pays the coal producer to visit the plant concerned, and with the permission of the owner, see for himself the conditions under which his fuel is to be used.

The best coal in the world cannot give its full heat value if it is not being properly fired. Although most large power makers are today fully aware of the value of carbon-dioxide recorders in connection with their flue gases, there are still some who think such apparatus to be a scientific fad. The good performance of any fuel depends first on complete combustion and second that large quantities of excess air be not admitted to the furnace, as otherwise the heated gases become mixed with this cold air, their temperature being thereby lowered and their efficiency as a heating medium destroyed.

The carbon-dioxide recorder is an excellent check on the proper burning of the fuel, since it registers at every instant the proportion of carbon dioxide (CO_2) contained in a given volume of flue gases. This with a recording draft gage and a thermometer gives an excellent idea of the way in which the plant is being operated. It is not too much to assert that a loss may often be converted into a gain through properly burning the fuel purchased.

It is the duty of the coal producer in cases of this kind to make suggestions to the power-plant manager which will safeguard the proper use of the commodity which the former is supplying. The same general argument applies to the proper testing of feed water, for poor results from a steam generator often attributed to the fuel may readily be traced to the condition of the boiler plate or tubes due to the admission of improper materials along with the feed water. Temporary and permanent hardness are the natural enemies of efficient heat utilization.

The Record of Input and Output

In some power plants, a check is kept upon the working of the installation by measuring the coal input and comparing the same with the power output. This is a particularly easy matter when the output is electrical. Now the number of pounds of coal consumed per kilowatt-hour generated (although a good test of the overall efficiency of the power plant) may sometimes be used as an adverse argument regarding the quality of the coal supplied. It is therefore advisable that the producer of the latter who is vitally interested in the proper sale and use of his commodity should knew something of the possible losses that may occur in a power house between the furnace and the wattmeter.

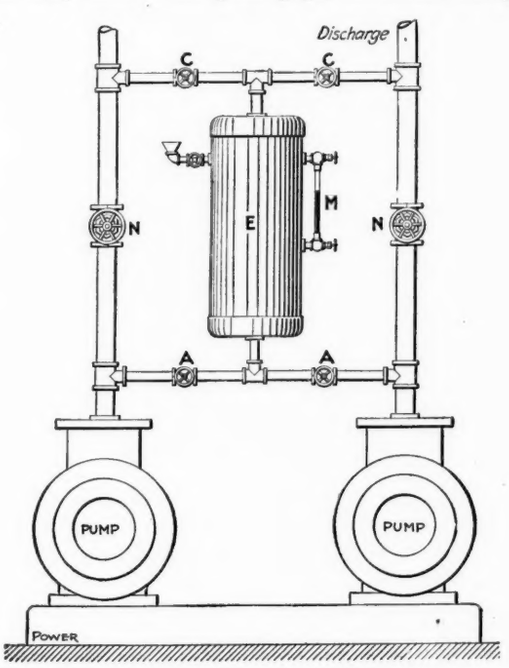
For example, much power may be wasted in leaky steam traps, in excessive condensation, in holding boilers as standbys when it would be perfectly safe to shut them down, and in running engines at uneconomical loads. Of course, a good power-plant manager is able to distinguish between losses incurred in this manner and defects in fuel supply, but it is open to question whether every power installation is conducted on highly scientific lines.

Consequently, when complaints are received concerning bad results from fuel, it might pay the owner of a mine to visit the power plant consuming his product with an eye open for bad operation, and to do this intelligently he should have at least a fairly comprehensive knowledge of the practical working of a steam power plant.

There are many other points which might be raised in support of the belief that it is not merely sufficient for a coal producer to sell fuel and then wash his hands of the results. A good salesman should be a good buyer if his position in the transaction were reversed. To be a good buyer one should know not only what he wants but what he is actually purchasing. And in the coal trade in order to be a good buyer, one must understand steam engineering.

Boiler-Compound Feeder

The illustration represents a good form of boiler-compound feeder, says R. C. McGahey in *Power,* where *E* is the body and *M* the glass gage, the merit being that



Compound Feeder Connected to Two Pumps

the compound does not pass through the pump. The feeder can be readily regulated or cut out by valves *N, C* and *A* while the pumps are in operation.

Editorials

Success

In a week or two we will announce the date of issue of a special "Success" number of COAL AGE. There isn't anything so close to the heart of the average individual as success, and the coal industry has an abundance of great men, great machines and great systems.

We will cover it all, dealing only with what has made good, whether it be a man, a method, a motor or a mining machine. We want to tell how success was won here, there and everywhere. A mine was a failure, it is now a successful operation; how was the change wrought? That's the story we want to tell in its every phase.

Therefore, we want our readers to help us make this proposed issue of COAL AGE the most interesting and valuable number we have so far gotten out. Tell us the story of men, mines and machines that have stood the test of everyday hard knocks. If you can't prepare a story for us yourself, then make a suggestion to us concerning what you have in mind, and we'll follow the tip and get the facts ourselves.

If you have a good story of an actual case, but don't care to sign the article, remember you don't have to. Think this over right now, and the chances are you can pen a description of something or somebody, that will not only interest other coal men, but benefit them as well.

Of course! we pay for the article you prepare for us.

What Will the New Year Bring Us?

We have all made our new resolves, rolled up our sleeves and started the work of 1915. The war may last all year, or it may end very soon. However, millions of people in this country have stopped speculating on this great uncertainty and have buckled down to free themselves as far as possible from the influences of the European trouble.

The outcome of our affairs in 1915 depends largely on ourselves. If the war continues no one need expect a boom in our own land, but by eliminating all waste of money, material and time, we can enter on an era of satisfactory, independent progress.

This does not mean we should hoard our money; on the other hand, the time is here when we must show confidence in ourselves and our nation by going ahead with long delayed plans. True! we must be careful—only harm could result from pulling the throttle wide open—but caution does not imply inaction. We have all had time to get our bearings and survey the road ahead, so a steady, certain advance in all lines of industry is now in order.

COAL AGE sees a brighter outlook for 1915, and we are therefore going to back our opinion by carrying out to fulfillment numerous extensions in our work. The coal industry has hit bottom, and all worth-while signs point to an increase in general mining activity. Labor troubles will be largely eliminated from this year's calendar, and the result will be a better feeling in the industry.

Therefore, let us all throw away our blue glasses, and above all else let us be sanely optimistic. No good can come from shouting untruths concerning business prosperity. People who follow this plan deceive no one, not even themselves. Likewise we must eliminate the other extreme, which is responsible for a flood of senseless pessimism. To many people, the face of futurity leers black and disagreeable. Hope to them is forbidden fruit. Imagination is of use only to portray calamities that never happen.

Add to your New Year's Resolutions the following: I will exercise hope and preach optimism every day during the year. I will not forget that I am a part of the greatest nation on earth, and that I live in a land of untold wealth and possibilities. I will not give ear to calamity howlers either in my office, my home or on the street. I will keep a cheerful countenance even should clouds gather overhead and I will impress on all I meet that clouds of whatever hue and density never stand still—there is always a wind to blow them away. Lastly, I promise to remember that I work in an industry that produces the second necessity of life—the first is food—and nothing can stop the demand or replace the product I send to the markets of the world.

At Home and Abroad

Between the optimistic and pessimistic American, your average citizen is "eternally fussed up." The American eagle in the imagination of our national evaluators is as often bedraggled like the sparrow after a fight as he is spread or displayed like the triumphant bird of heraldry.

For our part, we confess that most of the claims for arrogance or for regret equally fail to appeal to us. As for the claims of alien supremacy, we feel we could doubtless duplicate those vaunted conditions if we would accept them when duplicated. But somehow our American way, with its disadvantages, seems very good to us and we are ill disposed to be disturbed in our pursuit of it.

Samuel Dean has been showing us some German and French mining plants and we will readily grant that there is nothing like them in America. They are truly magnificent and show the genius of their engineers. Yet we cannot avoid the suspicion that there is no directorate in America but would discharge the officials in charge of these foreign enterprises if the men in them produced as little as they do in Germany—one ton per man underground. The miners in the United States produce from three to seven times as much per man for each working day and the result is that the cost of coal is much lower.

Moreover, the miners of the United States make better wages, at least twice as much as the German miners. Why then should we be ashamed? We have greater efficiency per man, cheaper coal and better paid working men. All we lack is "stylish works" and a greater safety.

Now there are parts of America where conditions in

the matter of safety are excellent, and it is by no means clear that all unsafe conditions are chargeable to excessive neglect of either employers or men. Let us not be misunderstood—we do not say that there is no neglect, for it is certain that there is, but we declare that it may not exceed the negligence manifested abroad.

The difference in the death rate in various parts of this country as a result of falls of rock and explosions of gas and dust clearly exhibits the fact that these accidents are in a class by themselves. Some operatives are much endangered by them; others are not likely to have them to face. Consequently, we will compare the other accidents underground in the United States with those in the Dortmund district of Germany, an area where about one-half as many men are putting in their time underground as can be found mining coal in the United States.

In 1911, the death rate from accidents underground other than "falls of ground" and explosions of gas and dust was 1.437 per thousand of those employed below the surface. The rate in the United States was only 1.28 for the same class of accidents in that year.

In 1912, in the United States, assuming the same ratio of employees to underground workers (1.202) as in 1911, we find that 1.11 persons were killed per thousand employed underground in the accidents selected, whereas in the Dortmund district 1.541 per thousand lost their lives in that specific manner. It will be granted readily we think that the roof-fall and explosions question is severe or unimportant according to locality and that the other accidents which we have here compared are more truly controllable, and it is in these accidents which have no necessary relation to locality that the American record is creditable.

But still those magnificent buildings fill the eye. Surely a people who can construct such magnificent mines, must be mining efficiently. Order, design and modernity are apparent on every hand, and we are prone always to connect together fine plants and efficiency. However, the two may have no connection whatever with each other. The magnificent structures may be only the outcome of munificent prices. Let us examine this carefully.

It would not be fair to compare German prices with American because it may be, at once, conceded that wages are unequal and the difficulties of mining are not on a parity. But it is permissible to compare German prices at one period with those at another and see whether the American market has advanced as liberally as the German. Since 1886 the average price of coal in Germany has risen 103 per cent. at the mines. In that same time it has fallen in the United States 4 per cent. We quote these figures on the authority of the British Board of Trade.

If we allowed our coal men to combine and to increase prices 103 per cent. when producers in other countries lowered their prices 4 per cent., the very foundations of our democracy would be shaken. It may be right to combine for fair prices, but we shall have to think twice before we consent to such a measure of syndicatism as has made such marvelous developments possible in Germany.

If we had such profits we also could build almshouses and bath houses and provide for pensioners. We also could build lamp houses like palaces and make our mine portals like triumphal arches. The American workingman, however, believes profits are criminal, the American consumer is raging horribly about coal combines and both are getting the benefit of a situation which is by no means profitable to the coal operator. And down in the hearts of the coal producers is a belief that while profits in his industry should be larger than they are, there is a limit which should be set for the good of the public, and he is sure that a 103-per cent. increase per ton in the present price would be many times that limit and should not be permitted in any democracy.

For if, instead of the $1.05, which was the average price of coal at the Pennsylvania bituminous mines in 1913, $2.13 was paid, just think how our mine roads could burgeon out with rose bushes and could be curbed with concrete. Then, indeed, we could model the superintendent's house after the home of a feudal baron—and the rest of the country could pay the bill.

But it is not our way. Such desirable conditions—and they are desirable—can only come here when the proletariat, which has been given liberal wages and cheap living, learns to put back into industry and permanent improvement what it now too largely expends in the grog shop, in frequent changes of apparel and in general waste.

Some Comments on the Panama R. R. Contract

The contract for supplying coal to the Panama R.R. has been awarded finally to Wm. C. Atwater & Co. (Vol. 6, pp. 814, 854, 892, 933, 1048). The coal is to be supplied from the Thelma and Nora mines of the Virginia Pocahontas Coal Co., at Coalwood, McDowell County, W. Va., and from the mine No. 1 of the Lake Superior Coal Co., near Huger, McDowell County, W. Va. It is generally understood that these mines are all working the upper Pocahontas beds, and if this be the case, it will be the first time that no coal from the No. 3 original Pocahontas bed has been supplied on this contract.

The bid of Atwater & Co., as originally reported, was for 350,000 tons, at $2.70, f.o.b. Hampton Roads, the proposal calling for 500,000 tons. We are informed that all of the bids were turned over to the U. S. Bureau of Mines for report on the various mines and to figure the cost of one million B.t.u., according to their standard formula, so as to reduce all bids to a common basis, combining the ash, heat value and price per ton. It is also stated that the Bureau of Mines sent their inspectors to the Atwater company's mines to obtain further data and samples before the contract was finally awarded.

There were several bidders from Pennsylvania, but they were all unsuccessful, although it is said that there was only one mill difference in the cost of a million B.t.u. as between the Atwater coal and Colver, Penn., coal.

The Government does not yet seem to appreciate the importance of the ash-fusing temperature of coals, although fuel experts are generally agreed that this and the ash percentage are the most important determinations on coals of similar nature.

Who Gets the Promotion?

COAL AGE last week, on page 1030, published a problem cartoon entitled, "Who Gets the Promotion?" We anticipated that the question would be a popular one, but we did not expect it would attract such wide attention. From the many answers received so far, it is quite certain this will be the most popular discussion we have ever printed. If you haven't already sent in your answer, do so today.

Sociological Department

Teaching English to Foreign-Speaking Men

By Peter Roberts*

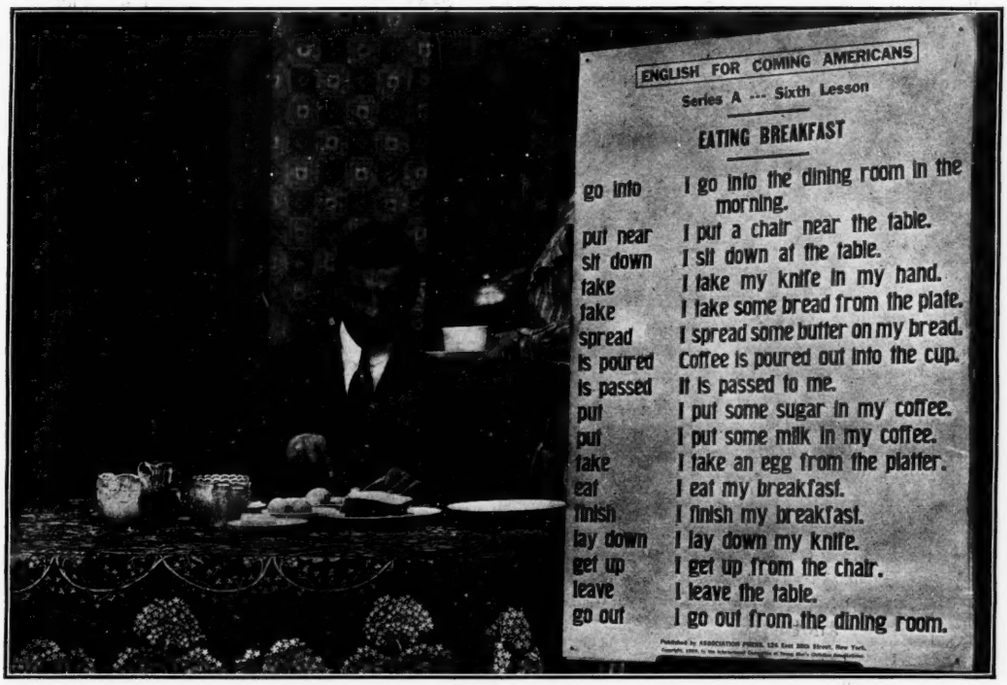
SYNOPSIS—The writer has elaborated a most successful system of teaching foreigners English without the employment of their native language in the process.

There are 15,000,000 foreign-born people in the United States, which is about 15 per cent. of the population. The proportion of male to female in this group is 129 to 100, so there are 8,450,000 foreign-born males in the country and of these more than 97 per cent. are employed in gainful industries. Of the males of both native birth and native parentage 75.5 per cent. are so employed. All the men of foreign birth are not foreign-speaking.

Of the 15,000,000, about one-third have their birthplace in English-speaking countries, while half of the remainder are more or less conversant with the English language. Thus, the problem of teaching English to non-English-speaking wage-earners is not as serious as some men would have us believe. The number of persons of foreign birth in the United States today not able to make themselves understood in English is not more than 5,000,000. This is about five per cent. of the total population.

Over 70 Per Cent of the Coal Miners Are Foreign-Born

The foreign-born are neither equally distributed among the states of the union nor are they found in equal numbers in the industries of the country. In agriculture, of the 10,500,000 male wage-earners only 9.1 per cent. are foreign-born; in coal mining, 750,000 men and boys are employed, and 70 per cent. of them are of alien origin. If 50 per cent. of the 525,000 foreign-born in the coal-mining industry are not conversant with the English language, it means diminished efficiency, increased accidents, want of harmony, and irritating misunderstandings between the coöperating agencies. The question then is, How can these men be taught English? I will explain the system used by us in doing this work.



The Roberts Method of Instruction by the Practical Illustration, the Spoken Statement, and the Printed Description

Basic Principles

This is based on three fundamental principles which should be observed by all anxious to learn or teach a language:

First: The *ear* is the organ of language. Speech is sound modified to convey thought, and the organ designed to catch sound is the ear. The eye and the hand may supplement, but if any man wants a working knowledge of any language he must use the ear in attaining it.

Second: The lessons given should deal with experiences

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NOTE—Article read before the West Virginia Coal Mining Institute, at Huntington, W. Va., Dec. 10, 1914.

perfectly familiar to the pupils. The simplest and most interesting actions of daily life should be clothed anew in the garment of the language to be acquired. You cannot discuss coal mining with a man who never saw a coal mine in operation, nor can you teach a man a language if you attempt to give him lessons dealing with objects and actions wholly out of the realm of his experience.

Third: Each lesson should conform with fundamental principles laid down by psychologists as aids to memory, the law of association of ideas, the law of contrast, the law of sequence in time, etc. By the aid of these, the memory is greatly relieved, and the pupil can better concentrate his attention on correct pronunciation and enunciation.

These three principles are used in the Roberts System of teaching English to foreign-speaking men.

Let us illustrate these principles. The first lesson we give a class of foreigners is about getting up in the morning. The lesson is as follows:

PREPARATORY COURSE

Getting Up in the Morning

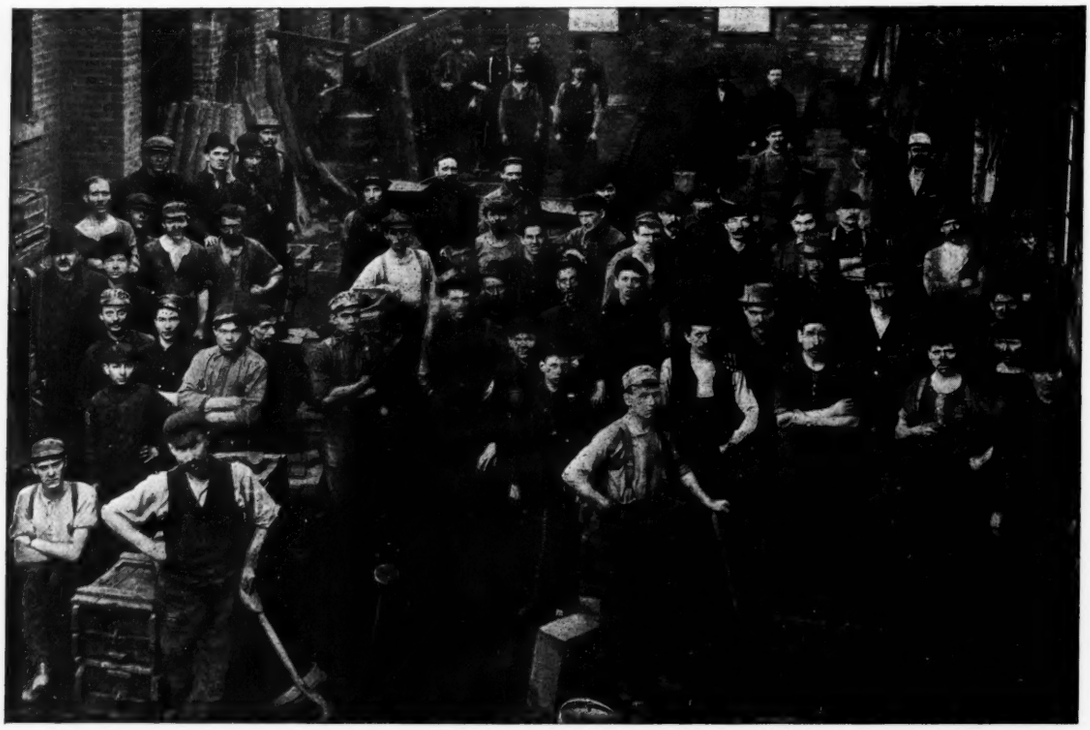
awake	I awake from sleep
open	I open my eyes
look	I look for my watch
find	I find my watch
see	I see what time it is
is	It is 6 o'clock
must get up	I must get up
throw back	I throw back the bed clothes
get out	I get out of bed
put on	I put on my pants
put on	I put on my stockings and shoes
wash	I wash myself
comb	I comb my hair
put on	I put on my collar and necktie
put on	I put on my vest and coat
open	I open the door of my bedroom
go down	I go down stairs

These sentences observe the sequence in time in the action of getting up in the morning. Each man goes through this stage every day. The word open suggests shut; find, lost; throw, catch; put on, pull off; open, close; etc. The teacher who does his work right will teach this lesson and build around it a vocabulary following the suggestions which come to him by the laws specified.

Teaching the Lesson

How is the lesson taught? The teacher has five steps to follow in teaching each lesson:

First: Oral instruction. Nothing is put before the eye or in the hand of the pupil. He is told to listen carefully to the words pronounced by the teacher, and repeat them after him. The teacher says, "I awake from sleep," suiting the action to the words, and the class says the sentence. This is followed in order by the other sentences as the class makes progress. The teacher talks slowly and distinctly, and is never weary of repeating. After about twenty or thirty minutes the class can rehearse the whole of the lesson from memory, at the suggestion given by the teacher with an appropriate gesture illustrating each sentence.



A Class in English in a Foundry at West End, Toronto, Canada, during the Noon Recess

Second: A chart on which the lesson is printed is now hung up, and the class sees the lesson in print for the first time. The teacher then leads the pupils in reading, going over the lesson three or four times, leaping from sentence to sentence, to test the capacity of the pupils to read.

Third: Sheets of paper are next given the pupils, on which the lesson is printed in both book and script type. Each scholar is provided with pencil and paper, and is told to write out the lesson, the teacher during the exercise passing from pupil to pupil to see how he does the work. Then after ten or fifteen minutes, he collects the papers, corrects them and calls the attention of the pupils to their defects.

Fourth: Review of the lesson. The teacher takes a

A Class Composed of Men of Many Nations

sheet of paper and covers the chart. He asks for the first sentence and suggests it by a gesture. The pupils say: "I awake from sleep." The teacher uncovers the sentence and says: "Good, and then what?" "I open my eyes." "Splendid, and then what?" etc. The pupils by this review get, not only the lesson, but also sentences such as "good," "right," "splendid," "that's it," "try again," etc., which in a short while they will be able to use in their conversation.

Fifth: Grammar practice. Grammar is not taught in the abstract; but grammatical forms are practiced in connection with each lesson, so that the pupils talk grammatically and are trained to do so from the beginning. This is done not only by each exercise, but also by reading and writing. The pupils who show an eagerness to learn our language, if they have a good teacher, will, in an incredibly short time, begin to converse in common, everyday English in their work and in their buying.

The Equipment

A word ought to be said about the tools used in this work. Three courses have been prepared for the men:

First: The Preparatory Course, which comprises thirty lessons; ten on domestic life, ten on work life, bearing directly upon the work in which the man is engaged, and ten on social life, helping this man so that he may go to the store or shop, postoffice or railroad station, and transact his business in the English language.

Second: The First Reader is the second course, in which lessons are given on the history of our country, on outlines of geography, dealing especially with the United States, and on the forms of our government, so as to prepare the foreigner who is anxious to become a member of our family to pass the examination prescribed by the federal government for naturalization.

Third: The Second Reader is a more advanced book, having readings in history, industries and civics for advanced pupils.

Accompanying each lesson are grammar suggestions, so that the teacher, in each session, may drill the men in certain forms which are essential to correct talking or writing.

For men employed in the coal-mining industry, we have prepared the following lessons:

INDUSTRIAL SERIES—BITUMINOUS MINE WORKERS

I. Going to Work

stands	The miner stands at the foot of the shaft
asks	The miner asks the foreman: "Give me a light"
takes	He takes his lamp and lights it
trims	He trims the wick
burns	The wick burns brightly
puts	The miner puts the lamp in his cap
walks	He walks along the entry
lights	The lamp lights the way
walks	The miner walks until he comes to his room
enters	He enters the room
looks	He looks around the room
left	All things are as he left them last night
takes	The miner takes off his coat and vest
hangs	He hangs up his coat and vest
puts	and puts away his dinner pail
goes	The miner goes to his box for oil
fills	He fills his lamp with oil
takes	He takes his tools out of the box
carries	He carries his tools to the face
lays	He lays down the tools
examines	The miner examines the face
begins	He begins the day's work

INDUSTRIAL SERIES—ANTHRACITE MINE WORKERS

VII. Firing the Shot

puts	The miner puts the powder in the hole
shoves	He shoves the powder back carefully with the drill

Teaching All Nationalities without Knowing the Tongue of Any

puts	He puts in the tamping and tamps it carefully
takes	He takes the needle, tipped with copper, so that it will not strike fire
puts	He puts the needle in the hole
completes	He completes the tamping of the hole
withdraws	He carefully withdraws the needle
examines	He carefully examines the squib
sends	He sends his laborer to warn the men in the next chamber
go	The men in the next chamber go to a place of safety
goes	The laborer goes down the road and shouts "Fire! Fire!"
shouts	The miner shouts "Fire! Fire!"
lights	The miner lights his squib with his touch paper
runs	The miner runs to the next crosscut
continues	The miner continues to shout "Fire! Fire!"
goes	The blast goes off

Results

The men who will learn these lessons will acquire a knowledge of English which will help the foreman and fireboss to talk to them intelligently concerning their work and duties. It will also enable them to communicate with their fellow workmen, so that they may feel that common bond of union which should pervade all industrial units. It enables the foreman or superintendent also to talk face to face with the foreigner, and avoid misunderstandings and trouble, which otherwise might disturb relations and demoralize an industrial plant.

Thousands of men, taught in classes using this system, are today able to talk, read and write in English. A year's faithful work done by any group of men, led by a good teacher using this system, will enable them to have a talking knowledge of our language, which will be a good basis for further instruction in any line the foreigner may choose. These classes for foreign-speaking men have been laboratories where men are tested, and the born leader or the mechanical genius has been discovered and set on the path that will give the industry and society far more than he ever could give if kept at the pick and shovel. The foreigners bring with them brain, as well as brawn, and the interest of each industry is conserved by giving the foreign-speaking worker in it the opportunity to come to his own in the industrial life of America.

Jermyn & Co.'s Relief Fund

A unique relief fund is maintained by Jermyn & Co. at its collieries in Rendham, Penn. The source of revenue is the sale of the empty powder kegs for 8c. apiece. This sale nets the fund from $125 to $150 a month, and out of this sum it pays $1 a day to any of the men who are injured or ill.

Formerly the twelve hundred Jermyn & Co. employees took their empty powder kegs to the nearest saloon and exchanged them for drink, but now it would be impossible for an employee to take one off the property. The mine workers appreciate and take an interest in this unique relief fund and guard its interests jealously.

If a man is killed, every employee is called upon for a dollar, the company contributes $400, and the wife or nearest relative of the deceased is presented with a check for $1000. To the credit of the company be it said that there has been only one fatality in the course of the last two years, during which it has produced one million tons of coal. This record was made despite the fact that most of the coal was produced by the dangerous work of robbing pillars.

Insurance against Accidents and Mine Caves

In addition to the above provisions for its injured employees, the company pays from its insurance fund varying sums, dependent upon the seriousness of the injury, to all victims of accidents who break an arm or a leg, or suffer some other major injury. It also repairs free of charge all houses affected by mine caves.

There is an excellent reason for the low accident record of the company in the many safety devices in use at the Jermyn & Co. collieries. Directions, with an arrow pointing the way to safety, are posted in Italian, Russian, Polish, Slovenian, Spanish, Hungarian and Greek in the mines. All the machinery in the breakers is inclosed. Automatic blocks at the heads of the shafts hold back all but the car to be loaded on the cage, and are not released until the gates have been closed and the cage started. The trips of cars at the slopes are held on a sidetrack, and not switched onto the track leading down into the slope until the way is clear.

Village Improvement and Sanitary Bath Houses

Trim green lawns, flower beds and whitewashed fence posts and foundations all contribute to the attractive appearance of the collieries, and there is a hospital above ground as well as those required by law at the foot of the shafts, and a trained first-aid corps ready for instant service.

Another attraction is a wash-house with two hundred lockers, enough individual shower baths with hot and cold water to accommodate everyone without delay, concrete floors, sanitary drainage and ventilators. It is in charge of an old miner of thirty years' service, who, for $50 a month, scalds, washes and boils 500 towels a day, so that every man has fresh towels. Wire mats are provided in front of the lockers, and all diseased men are rigorously excluded. It is said that miners' wives urge their husbands to work for Jermyn & Co. At any rate, only 10 per cent. of the entire number of its employees are unmarried.

New Rescue Station at Herrin, Ill.

The mine-rescue car attached to the Benton station of the Illinois Mine-Rescue Station Commission has been ordered to Herrin, for the purpose of establishing a permanent substation at that city. Walter Scott, of Harrisburg, and Walter Nichols, of Benton, are to be in charge.

There are three mine-rescue stations under the control of the Commission. These are located at La Salle, Springfield and Benton respectively. Up to this time, a car has been attached to each station, so that the course of training and instruction might be taken by men who were unable to come to any of the three centers. The cars have been on the road for over three years, and that from Benton is the first to be given a permanent location. It is probable that the other two cars will be similarly located after the most suitable cities have been determined.

A committee representing the operators, miners and the city officials of Herrin met with the Mine-Rescue Commission at its last meeting, and presented the request of Herrin for the establishment of a substation. This committee consisted of James S. Reed, state mine inspector, William Burton, board member of the United Mine Workers of America, Mayor C. E. Anderson, of Herrin, Milo McGowan, J. F. Goalby and Evan D. John.

The car has been placed on the Chicago & Carterville spur, and has a telephone so that it may be called at any time. The city council of Herrin has placed two rooms in its new city hall at the disposal of Messrs. Scott and Nichols, and a large room on East Cherry St. has been fitted up for training work.

The next legislature will be asked to appropriate sufficient funds to establish a station at Herrin similar to those already erected at Benton, Springfield and La Salle.

Discussion By Readers

Mining Laws, Legislation and Mine Regulations

Letter No. 14—I believe a practical discussion of mining laws and a careful consideration of mine regulations, by practical miners, operators of long experience in coal mining and mine inspectors, as suggested in COAL AGE, will be productive of good results. By this means, many valuable suggestions will be made, in reference to amending existing statutes or enacting new laws that will greatly simplify and facilitate the enforcement of these laws, in the operation of mines.

The safety of life and security of property do not depend so much, however, on legal enactments as on the observance and strict enforcement of wise and practical mine regulations. Many existing laws are not enforced or obeyed because of some objectionable features contained in them, which impose unnecessary burdens on either the miner or the operator. Although such laws may have seemed at first desirable; in their practical application they are not calculated to attain the end or purpose sought. Thoughtful and practical miners, superintendents and foremen are in a better position to understand what is required in the way of legislation, in order to safeguard the work of mining coal, than are the law makers themselves.

The mining law of Tennessee provides for certificates of two classes, Class A and Class B. The law also divides all coal mines into four classes; namely, Class A, including all gaseous mines; Class B, dusty mines; Class C, mines neither gaseous nor dusty, employing as many as 20 men; and Class D, the same as Class C, but employing less than 20 men. Class-A certificates are required of all foremen in charge of mines of the first two classes, while Class-B certificates enable the holder to act as foreman in mines of the two remaining classes.

My experience leads me to suggest that there should be three classes of certificates, A, B and C; and that a holder of Class-C certificate, making him eligible to foremanship in mines belonging to Classes C and D, should also be permitted to act as assistant foreman in mines of Class B. In like manner, a holder of a Class-B certificate, making him eligible for foremanship in mines of Class B, should be permitted to act as assistant foreman in mines of Class A; but in order to act as foreman in these mines he must first secure a Class-A certificate.

In respect to classification of mines and certificates, the present law of Tennessee works a hardship on the operator of a dry mine, generating no gas and employing but a few men. To operate this mine in compliance with the law, he must employ a foreman holding a Class-A certificate, while one holding a Class-B certificate would be just as competent to take charge.

In respect to examination for certificates of competency, the examining board in Tennessee is authorized by law to make any rules and regulations pertaining to the examination of candidates that they deem proper. It has been the custom with the present examining board to give one examination for *all* candidates, with the understanding that a candidate whose paper received a mark above 75 per cent. and who had had the necessary experience in gaseous mines, would be entitled to a Class-A certificate; while a candidate whose paper received a mark not below 60 per cent. would be entitled to a Class-B certificate. But any candidate whose mark fell below 60 per cent. would fail to pass the examination. It seems quite clear that better results would be obtained if the questions propounded were suited to the class of certificate the candidate desired to obtain, instead of expecting all candidates to answer the same questions.

The advantage of having three grades of certificates for mine foremen would be that the demand for Class-A certificates would thereby be reduced, while the standard of efficiency in the examination would be raised. Since it is merely the presence of explosive gas in a mine that makes it necessary to rate that mine as belonging to Class A, it is important that the foreman in charge of such a mine should pass a rigid test for a gas-boss certificate, to obtain which he must have a thorough knowledge of the dangers of mine gases. This knowledge would not be required of a foreman to take charge of mines belonging to Classes C and D.

My attention has been drawn to the question raised by Mine Foreman William Crooks, Edgewater, Ala. In his letter No. 5, COAL AGE, Nov. 21, p. 839, Mr. Crooks asks how many mine inspectors dare to enforce those laws that are offensive to the large coal companies who were instrumental in securing their appointment. He states that the inspector who is appointed under such conditions cannot be expected to oppose the wishes of those responsible for his appointment. He speaks disparagingly of a candidate having a "good pull," or a "good stand in." Is it not true that most men holding positions of trust and honor have secured these positions through influence? It does not necessarily follow that this fact will cause him to neglect his official duty in the interest of those who have supported him. Mr. Crooks does not suggest a better method for the selection of mine inspectors. I fully believe that the appointment of mine inspectors by the governor is the best method that can be adopted, in the interest of safety for the miner.

In regard to the enforcement of existing laws, I would say that it is well nigh impossible to make a law so broad as to apply with equal justice to all the mines in the state. Owing to the constantly changing conditions in mines, it is necessary for the mine inspector and the mine foreman in charge, frequently, to use their best judgment. I will say that in Tennessee the chief mine inspector's ruling or judgment is law in many instances.

In closing, I want to emphasize the importance of the point already suggested that the examination of the mine should be made by the gas bosses *within three hours of the time for the men to commence work* and that evidence of their examination should be left at the face of each working place. This is the law in Tennessee and it needs little to be added in this respect. The Tennessee law also

states that there shall be employed one or more gas bosses, as conditions, extent of workings and other circumstances may require. This provision of the mining law of a state, together with honest and competent inspection, will go far toward reducing mine accidents.

JOHN ROSE,
District Mine Inspector.

Dayton, Tenn.

Letter No. 15—For the past 13 years, the mines in Iowa have been operated under what is known as the "shot examiners' law." This law requires that, in all mines where coal is blasted from the solid, competent persons shall be employed to examine all holes before they are charged. The law authorizes the examiner to prohibit the charging and firing of any shot that in his judgment would be unsafe. It requires the state mine inspector of the district to certify to the mine operators in his district such persons who have proved to him their competency to act as shot examiners.

Notwithstanding the opposition that was met in the passage of this law, I believe I am correct in stating that the good results brought about since, by its operation, have caused a unanimity of opinion on the subject; and the need of employing shotfirers, acting under the same authority as shot examiners, is now no longer in dispute. I believe that this conclusion has been reached in the mind of every considerate mining man. Under the present system, the examination and firing of shots by different persons naturally give rise to a conflict of interest; and it is this condition that suggests the wisdom of enacting a law that will compel all operators of coal mines to employ shotfirers as well as shot examiners, and to have all shots fired by them after other employees have left the mine.

In my recent report, contained in the 17th biennial report of the state mine inspectors of Iowa, for the two years ending June 30, 1914, pp. 61-65, I have recommended the enactment of a law by which all shots should be examined and fired by one and the same party, who should be subject only to state regulation in the performance of his duties. It is a foregone conclusion that as long as the practice of "shooting off the solid" is permitted in the mines of Iowa, the old-time system of every miner firing his own shots will be forever banished.

The dual authority under which the mine examiners and shotfirers have, for a long time, acted, has been a bitter bone of contention between the operators and miners of this state; and it is earnestly hoped that the enactment of a new law making it compulsory for all shots to be examined and fired by a competent person authorized by the mine inspector and employed by the coal company will forever put an end to the present controversy.

R. T. RHYS,
State Mine Inspector, Dist. No. 2.

Ottumwa, Iowa.

Letter No. 16—The interesting discussion now being conducted in COAL AGE calls to mind an incident in my own experience as mine inspector in Iowa, a few years ago. At that time, I was notified by the inspector of Missouri that the workings of a certain mine in his district had been extended across the state line into Iowa. He stated that, according to the decision of the attorney-general of Missouri, his jurisdiction terminated at the state boundary line. For this reason, he requested me to look after that portion of the mine that was located in Iowa.

It naturally occurred to me that if the Missouri mine inspector had no jurisdiction over that portion of the mine in Iowa, I would have no jurisdiction over that portion located in Missouri. Under these circumstances, it appeared that the proper inspection of the mine and enforcement of the mining laws of either state would be somewhat difficult. I, therefore, placed the matter before the attorney-general of Iowa, whose decision, as I had supposed, gave me no jurisdiction beyond the state line.

Looking further into the matter to find, if possible, a precedent that would serve as a guide in such cases, I found that a similar opinion had been rendered by the attorney-general of Ohio, in regard to a mine in *that* state which had been extended across the boundary into West Virginia. The coal mined from this property in West Virginia was hoisted in Ohio, where all the surface equipment, air shafts and ventilating machinery were located. The mine generated gas.

Upon the application of the Ohio mine inspector, the attorney-general of that state decided that the mine inspectors, in either state, respectively, had no jurisdiction beyond the state line. It is well known that the safety of the entire mine often depends on the conditions that exist in a single portion or district of the mine; and the lack of jurisdiction over the whole mine makes it practically impossible for either of the mine inspectors concerned in the inspection of an interstate mine to guarantee the operation of the mine in full compliance with the laws of his state.

Recognizing this fact, the attorney-general of Ohio suggested that the Ohio inspector should arrange with the mine inspector of West Virginia to examine the mine at the same time, each confining his inspection to that portion of the mine within his own jurisdiction. After making the examination, the two inspectors could then compare notes and, if possible, reach a satisfactory conclusion in regard to what each considered necessary for the safe operation of the mine. In doing this, however, it might happen that either or both of the inspectors would be compelled to disregard some of the requirements of the mining laws of their respective states.

Considered from the standpoint of the safety of human life and the security of property, and remembering that explosions, fires, squeezes and sudden inrushes of water or gas do not respect state lines, in an interstate mine, there is every reason why the inspection of such a mine should be untrammeled and in no way embarrassed or hindered by differences in the requirements of the respective state laws.

Allowing that the decision of the attorneys-general, in these cases, is in conformity with the general laws of state jurisdiction, it has been suggested that the problem of the inspection of interstate mines could be solved by placing such mines under Federal supervision. Another suggestion is that either state inspector should be given full jurisdiction over the entire mine by interstate agreement.

So far as I know, the mining law of every coal-producing state gives the mine inspector the power to call out the men from any portion of the mine that, in his judgment, presents unsafe conditions. Under this provision of the mining law, the refusal of the operator of an interstate mine to voluntarily concede to the request and instructions of the mine inspector of a border state,

having jurisdiction over a portion of the extended workings of said mine, would be sufficient reason to warrant said mine inspector's withdrawing the men from that portion of the mine. In the event of his order being disobeyed, he could apply to the courts of his state for an injunction forbidding the working of that portion of the mine in his jurisdiction.

In my own case, to which I have referred, I notified the operator before going to the mine that I expected him to give me jurisdiction over the entire mine to the extent that would enable me to protect the men working in Iowa, as required by the mining laws of that state. This was granted, and requests for several improvements of the surface equipment located in Missouri were fully complied with and results were satisfactory to all.

JOHN VERNER.

Chariton, Iowa.

Letter No. 17—There is no question but that the mining laws of Kansas can be improved, in many respects; but it goes without saying that there would be fewer accidents occurring in the mines if the present mining laws were enforced and obeyed.

The law in respect to the undermining and shearing or cutting of coal before firing a shot is very specific. The law makes it a misdemeanor for a miner to drill a hole or fire a shot, at the face of any room or entry, until the coal intended to be broken down by the shot has been undermined to a depth of at least 2 ft. and sheared or sidecut the full thickness of the seam, to a depth equal to that of the hole. The law also provides that the width of the shot at the back of the hole shall not be greater than the width between the mouth of the hole and the sidecut. The law provides a fine for anyone guilty of such misdemeanor.

This law was intended to reduce the number of blown-out shots that occur as a result of "shooting the coal off the solid" without undermining or cutting. I regret to say that the law is almost entirely disregarded. Some unscrupulous miners still continue to drill their holes on the solid and overcharge them, in spite of this warning. In my opinion, the only way to do away with this dangerous practice is to employ competent shotfirers, and instruct them to tamp all shots in entries or roomnecks and other narrow work themselves; and not to fire any shots that, in their judgment, are liable to cause an accident.

Another dangerous practice, much followed in Kansas mines, is the use of dynamite for shooting coal. This practice also is contrary to the mining law of the state, which prohibits the use of dynamite or other detonating explosives for blasting coal in the mines of the state. The law provides, however, that dynamite or other detonating explosives may be used under such rules and regulations as may be agreed upon between the employers and the employees. This provision practically annuls the law and, in my opinion, should be eliminated from the statute.

By such a provision, the responsibility for an accident due to the use of dynamite in blasting coal rests on the mine foreman and the mine committee. It is often a difficult matter for the foreman and the committee to come to any agreement as to the amount of dynamite that can be used with safety, in a particular place. However, as the miner is not compelled to purchase his dynamite at the mine, he often secures an extra supply unknown to the foreman and the committee. The result is that an excessive amount of dynamite is frequently used.

It is a very common practice here to mix dynamite and black powder, in the same hole. It cannot be denied that, in general, this is a dangerous practice, although some experienced miners frequently use a small piece of dynamite, at the bottom of the hole, to break the coal more readily at that point. I may say that the use of dynamite, in Kansas mines, dates back but a few years, when it was introduced by some unskilled miners; but the practice has grown to considerable proportions and should be abolished.

The state law of Kansas can be improved, in respect to the selection of mine inspectors. Candidates for this office should be made to pass a very rigid examination before a properly authorized and constituted mining board. Such an examining board should be composed of representatives of the operators and miners, who should coöperate in preparing an examination that would determine both the theoretical and practical knowledge and the ability of each candidate. Whether the mine inspector is appointed by the governor or elected by the miners, he should be chosen from persons who have passed a successful examination and been certified by the examining board, as required by law.

In my opinion, the law should also provide for the examination and certification of mine foremen, firebosses and hoisting engineers. Inasmuch as these positions are the most responsible ones in the operation of a coal mine, the persons filling them should possess sufficient technical education and practical knowledge and experience as to fit them for the proper discharge of their duties.

C. J. VANRIETTE, Mine Foreman,
Central Coal & Coke Co.

Scammon, Kan.

The Foreigner in Mining

Letter No. 11—Referring to Mr. Parfitt's second letter, COAL AGE, Nov. 21, p. 841, in which he explains his deductions as based on "an ethical analysis of the characteristic traits of the foreign element," I want to say that, even on such a basis, his conclusions are erroneous and his statements far too sweeping. I feel this would voice the sentiment of a large majority of mine officials, whose experience with this class of labor, like my own, has extended over many years.

I understand an *analysis* to mean an unraveling process by which one discovers the original elements or the cause of known facts. But Mr. Parfitt's reasoning is *a priori*, or from cause to effect. He shows that the early training and environment of the foreigner have developed a character for deception, immorality, ignorance, etc. In addition to these characteristics, in a second letter, he adds the element of untruthfulness when he states, "Obviously their answer was contrary to their practical belief."

The ability to render a just verdict on a question as large as the one under discussion requires much close study. Years of observation are necessary before one can appreciate the foreigner and understand him sufficiently to give an opinion that is untainted with prejudice. Without this knowledge, any criticism of his mental processes bids fair to be as unjust as it is superficial.

In reference to their holidays, which they celebrate with evident loyalty, the act only shows their love for the land of their fathers. The recurrence of these holidays is as dear to them as that of the Fourth of July or

other holidays are to Americans. In our judgment of the foreigner, we must not forget that, in spite of these sporadic celebrations, the production of coal in this country, which has come to be so dependent on foreign labor is the wonder and admiration of the world.

Every intelligent person who is interested in our country's industrial supremacy knows that a loss of even 50 per cent. of the foreign labor employed in the mills and mines of the country would be an irremediable loss. Taking it as granted that foreign labor constitutes so valuable an asset in our industries, it should be our aim and constant endeavor, by precept and example, to cultivate a fraternal feeling for the foreigner, rather than to create a sentiment inimical to him.

Recognizing our dependence on foreign labor I am glad to say that it is, at present, by no means the intricate problem it was 25 or 30 years ago. At that time, few of these foreigners spoke English; and no English-speaking miner would accept of a foreigner as his "butty." When the foreigner went into the mine, he was compelled to work by himself, often at the risk of his life. It was this fact that retarded the work of assimilating foreign labor and utilizing it for the mining of coal. The process has been slow; but time and their own earnest endeavors, assisted by those foremen who have taken a personal interest in them, are rapidly bringing the question of their availability to a successful issue. Now, there are thousands of foreign miners working in our mines who can mine coal as well as the old-time miners whom they have replaced.

A wise foreman places a new arrival in charge of an experienced compatriot, who gives him the necessary instructions, until he is able to mine coal by himself. Interpreters are found in almost every mine, who explain orders to those who do not understand.

In Mr. Parfitt's previous letter, he regarded the education of the foreigner as a "herculean task," and finally declared it to be "impracticable"; but, in his second letter, he recants and says "He is still capable of mental education." The fact that so many of these foreigners are now returning home to take part in the war is, to my mind, evidence that they desire the same freedom for their homeland that they have enjoyed here in America. Their return, at this time, to assist their homeland in one of the bloodiest wars of history, deserting their present opportunities for advancement and gain, in exchange for peril and probable death, strengthens my opinion and admiration of them, and forces me to the conclusion that they are excellent material with which to make good American citizens.

CHARLTON DIXON.

Pittsburgh, Penn.

Study Course in Coal Mining

BY J. T. BEARD

The Coal Age Pocket Book

THE CIRCLE

The circle is a plane figure bounded by a curved line, called its **circumference,** every point of which is equally distant from a point within which is its **center.**

A straight line drawn from the center to any point in the circumference of a circle is its **radius.**

A straight line joining any two points in the circumference and passing through the center of the circle is its **diameter.** If such line does not pass through the center, however, it is a **chord.**

A straight line touching the circumference of a circle in a single point only, however far it may be produced in either direction, is **tangent** to the circle at that point. A tangent to a circle is always perpendicular to the radius drawn to the point of tangency.

THE ELLIPSE

The ellipse is a plane figure bounded by a curved line such that the sum of the distances of any point of the curve from two fixed points within called the **foci** is constant. This sum is equal to the length of the **major axis,** which is the straight line passing through the foci and terminated by the curve. The bounding curve is the **perimeter** or **circumference** of the ellipse.

The point on the major axis midway between the foci is the **center** of the ellipse. Any straight line passing through the center and terminated by the circumference is a **diameter.** The diameter at right angles to the major axis is the **minor axis** of the ellipse.

The points in which a diameter meets the circumference are **vertices,** the ends of the major axis being the **principal vertices** of the ellipse.

NOTE—The terms "circle" and "ellipse," as used, often refer to the bounding line or circumference of the figure instead of to the figure itself.

MENSURATION

Mensuration is that branch of applied geometry that treats of the calculation of the lengths of lines, the areas of surfaces and the volumes of solids. The following formulas are of the most general application:

The Triangle—Denote the three angles by A, B, C; and the sides lying opposite to them by a, b, c, respectively.

$$A + B + C = 180°$$

$$a : b :: \sin A : \sin B$$

$$\frac{a}{b} = \frac{\sin A}{\sin B}$$

The proportionality of any two sides of a triangle to the sines of their opposite angles; or, in other words, the equality of the ratios of any two sides of a triangle and that of the sines of their opposite angles is one of the most useful principles in the solution of triangles, and the one most frequently used in the practice of surveying.

The Coal Age Pocket Book

The solution of a triangle is always possible when three parts are given or known, provided one of these is a side. It is possible to form but one triangle with three given lines or sides; but, with three given angles, an infinite number of triangles can be formed. Hence the necessity of knowing at least one side.

The solution of triangles presents four cases requiring separate treatment for each case; namely,

1. Given two angles and any one side.
2. Given two sides and an angle opposite one of them.
3. Given two sides and the included angle.
4. Given any two parts of a right triangle.

Cases 1 and 2—The first two of the above cases are solved by applying the formulas just given depending on the ratio of any side to the sine of the opposite angle, as shown by the following examples:

Example—Given, in a triangle, A = 40 deg., B = 30 deg. and b = 100 ft.; to find the other parts of the triangle.

Solution—The third angle is C = 180 — (40 + 30) = 110°. The remaining sides are

$$a = \frac{\sin A}{\sin B} \times b = \frac{\sin 40°}{\sin 30°} \times 100 = \frac{0.6428 \times 100}{0.5} = 128.56 \text{ ft.}$$

$$c = \frac{\sin C}{\sin B} \times b = \frac{\sin 110°}{\sin 30°} \times 100 = \frac{0.9397 \times 100}{0.5} = 187.94 \text{ ft.}$$

Example—Given, in a triangle, B = 45 deg.; b = 400 ft. and c = 250 ft.; to find A, C and a.

Solution—The remaining angles are first found; thus,

$$\sin C = \frac{c}{b} \times \sin B = \frac{250}{400} \times \sin 45° = \frac{5 \times 0.7071}{8} = 0.44194;$$

and $C = 26° 14'$, *nearly*

Then, $A = 180 - (45° + 26° 14') = 108° 46'$

The unknown side can now be found; thus,

$$a = \frac{\sin A}{\sin B} \times b = \frac{\sin 108° 46'}{\sin 45°} \times 400 = \frac{0.94684 \times 400}{0.70711} = 535.61 \text{ ft.}$$

This principle, which is called the **law of sines,** can always be applied when two angles and any side are given; but when two sides and only one angle are given it cannot be applied; unless the given angle lies opposite one of the given sides, or the triangle is a right triangle.

Case 3—When two sides and the included angle are given, there are two methods of solution, as follows:

1. The half difference and half sum of the other two angles are first found by the formulas

Half difference, $\tan \frac{1}{2}(A - B) = \frac{a - b}{a + b} \tan \frac{1}{2}(A + B)$

Half sum, $\frac{1}{2}(A + B) = \frac{1}{2}(180° - C)$

Having found the half sum and the half difference, add these together to obtain the greater angle; and subtract the half difference from the half sum to obtain the lesser angle.

Inquiries of General Interest

Humidifying Mine Air

We have to contend with a serious proposition, in our mines, in respect to keeping the mine moist to prevent the drying out of the dust and avoid the dangers resulting therefrom. I would like to get the views of the readers of COAL AGE as to the proper method to pursue to accomplish the necessary humidification of the mine air. The facts, in our case, are as follows:

The mine is ventilated by a blowdown fan and the exhaust steam from the fan engine is discharged into the downcast shaft. Experiments have shown, however, that the dampness or degree of humidity imparted to the air current by the exhaust steam is practically lost at a distance of 600 ft. from the bottom of the downcast shaft.

Inasmuch as the live workings are located at a distance of 4000 ft. inby from this point, it will appear that we are deriving no benefit from the steam exhausted into the downcast shaft. The plan has not accomplished the purpose intended and the results are not what were anticipated.

I want to ask, What is the best method of accomplishing the necessary humidification of the air current passing through the live workings of this mine? Can this be accomplished by passing the air current through a film of water at the point of distribution of the air; and will sufficient moisture be absorbed, by that means, to keep the dust below the point of ignition?

Another plan that has been suggested and considered is to install a line of pipe in the main-intake air course, with plugs at every 200 ft., to which could be attached a hose 100 ft. long. The pressure on the pipe line would be about 104 lb. per sq.in. Will this method furnish sufficient moisture to dampen the dust and render the mine safe, in this respect?

MINER.

Caldwell, Ohio.

In considering a proposition of this nature, it must be remembered that the capacity of air for carrying moisture will depend on the temperature of the air. The average temperature of a mine is generally above that of the outside atmosphere. This is always true in the winter season, which is the most important period in the production of coal. Therefore, although the air current entering the mine may be fully saturated with moisture, owing to the discharge of the exhaust steam of the fan engine into the downcast shaft, this saturated intake current, on assuming the higher temperature of the mine, soon becomes comparatively dry, because the weight of moisture that saturated it at the lower temperature of the outside air is insufficient for saturation at the higher temperature of the mine.

For the sake of illustration, let us first estimate roughly the weight of moisture in the exhaust steam. For this purpose, assume that a current of 100,000 cu.ft. per min. is passing into the mine, under a water gage of 2 in. Then, taking the general efficiency of the circulation as 60 per cent., the indicated horsepower of the engine necessary to supply this circulation is

$$H = \frac{100{,}000 \times 2 \times 5.2}{0.60 \times 33{,}000} = \textit{say } 50 \textit{ hp.}$$

Now, assuming a water consumption of 30 lb. per hp. per hr., for a feed-water temperature of 100 deg. F. and a gage pressure of 70 lb., the weight of steam exhausted into the shaft is, on this basis, $50 \times 30 = 1500$ lb. per hour.

Assume, further, for the sake of calculation, that the outside temperature is 40 deg. F. and the relative humidity of the outside air 50 per cent. Then, since the vapor pressure, at this temperature, is 0.1216 lb. per sq.in., the weight of water vapor necessary to saturate an intake current of 100,000 cu.ft. per min., is

$$W = \frac{0.6235 \times 0.50 \times 0.1216 \quad 100{,}000 \times 60}{0.37\ (460 \quad 40)}$$

$$= \textit{say } 1230 \textit{ lb. per hr.}$$

From this it is seen that the weight of steam assumed to be discharged into the downcast shaft is more than sufficient to saturate this air current, under the assumed conditions. Indeed, it would saturate this intake current, even assuming an outside humidity of 40 per cent. at the given temperature.

Now, assuming the temperature of the live workings to be, say 70 deg. F., we may ask, How much moisture will be absorbed from the mine workings by this air current, which was saturated in the downcast shaft, at a temperature of 40 deg. F., but reaches a temperature of 70 deg. F., in its passage through the mine? The vapor pressure at the mine temperature (70 deg. F.) is 0.3602 lb. per sq.in.; and, remembering that the volume of air in circulation varies with its absolute temperature, the quantity of water or moisture absorbed from the live workings by a current of 100,000 cu.ft. per min. is found as follows:

$$W = \frac{0.6235 \times 0.3602 \times 100{,}000 \times 60}{0.37\ (460 + 40)\ 8\frac{1}{3}} = 874 \textit{ gal. per hr.}$$

This quantity of water represents a weight of 7283 lb., or 3.64 tons, which will be absorbed from the live workings each hour by an air current of 100,000 cu.ft. per min., under the assumed conditions. The result shows the enormous drying power of such an air current. It also shows, with more or less accuracy, the volume of water that would have to be sprayed into the current, through a pipe line, in order to maintain a uniformly continuous condition of the mine with respect to moisture, assuming no drainage from the overlying strata and the full saturation of the return air current.

One of the best methods that has been suggested for the practical humidification of the mine air throughout the mine is a pipe-line system with fine sprays of air arranged at regular intervals along the pipe line. If such a system is installed on an intelligent basis, in accordance with the existing conditions in the mine, good results may be expected.

Examination Questions

Miscellaneous Questions

(*Answered by Request*)

Ques.—Under what conditions may afterdamp become explosive?

Ans.—It frequently happens, under the varying conditions in mines, that the afterdamp of the mine explosion contains much unburned methane (marsh gas); and, frequently, much carbon monoxide is present. The addition of fresh air to afterdamp containing these gases will render the mixture highly explosive.

Ques.—What conditions, other than the volume of air passing through the fan or furnace, should a mine foreman consider in order to determine whether the mine is properly ventilated?

Ans.—Assuming that the volume of air passing into the mine is sufficient to meet the requirements of the mine law, it is important to ascertain its relative humidity. The intake air current should be brought, as nearly as possible, to a state of saturation, in order to prevent the absorption of moisture from the dust accumulated in the entries and workings of the mine, which always takes place when passing a comparatively dry air current through the mine. It is also necessary to see that the entire quantity of air, as far as practicable, is conducted forward and made to sweep the working face; and to so distribute the air that the velocity of the current, at the working face, will be sufficient to carry away the gases that would otherwise accumulate and yet not be so great as to make the use of safety lamps dangerous.

Ques.—In what parts of a mine are accumulations of dust more dangerous than in others, and why?

Ans.—Accumulations of dust on the intake airways are more dangerous than on the return, because the dust is then carried into the mine by the air current. Also, accumulations of dust in proximity to the face of the coal are always dangerous, in case blasting is done in the mines. All such accumulations of dust should be carefully removed, and the roof, floor and sides of the place thoroughly sprinkled before blasting is done; otherwise, the dry dust may be blown into the air by the force of a blast and ignited by its flame, causing a local explosion of dust that may, under favorable conditions, be propagated throughout the mine.

Ques.—State how the several mine gases may be detected; in what proportions in the air they are fatal to life; and in what proportions they will extinguish light.

Ans.—This question cannot be answered with absolute accuracy, owing to the difference in the effect of mine gases on persons of different temperament and on lamps burning different oils. Moreover, the results are varied considerably by the presence of other gases or dust. However, methane or marsh gas (CH_4), which is detected in mines by its effect on the flame of a safety lamp, may be regarded as being fatal to life when it much exceeds 50 per cent. of the air breathed. At this point, the oxygen of the air will be reduced to about 10 per cent. of the mixture, which is generally considered as fatal to life. The percentage of methane required to extinguish the flame of a candle, in otherwise pure air, is about 16.7 per cent.

Carbon monoxide present in mine air may be detected by what is known as the "blood test," in which two or three drops of blood in an ounce of water is colored a buff-yellow when air containing this gas is passed through the solution. A better test, however, is the effect of this gas on small animals, such as mice or birds, which become prostrated in, perhaps, one-twentieth of the time necessary to produce a similar effect on human life. The effect of this gas is cumulative when breathed into the lungs, and a mixture of otherwise pure air containing 0.5 per cent. of carbon monoxide will generally produce fatal effects when breathed. The gas is not extinctive of flame.

Carbon dioxide, when present in mine air, is best detected by its effect, which is to dim or extinguish the flame of a lamp. When breathed in sufficient quantities, a considerable length of time, the gas produces dizziness, headache and nausea. Assuming carbon dioxide to be added to otherwise pure air, a candle flame is first extinguished by it when this gas forms 13.4 per cent. of the mixture. The mixture, however, does not necessarily become fatal to life until the gas reaches 18 per cent.

Hydrogen sulphide (H_2S) is generally detected in mines by its smell, which resembles that of rotten eggs. Otherwise pure air containing only 1 per cent. of hydrogen sulphide is generally fatal to life when breathed but a short time. This gas contains no oxygen and it is probable that when from 16 to 18 per cent. of it is present in otherwise pure air, the mixture would extinguish the flame of a candle.

Ques.—State the conditions under which the presence of the various mine gases may be expected.

Ans.—Methane may be expected in the live workings of mines generating this gas, particularly in the rise workings of the mines and in proximity to faults. Carbon monoxide may be expected where gob fires are in progress or slow combustion is taking place where the ventilation of the mine is deficient. Carbon dioxide may be expected in all cases where the mine is improperly ventilated, especially in dip workings. Hydrogen sulphide is seldom found in appreciable quantities in coal mines.

Ques.—State the volume of each of the principal gases composing atmospheric air.

Ans.—Atmospheric air is composed of two principal gases, which are mixed in the proportion of one volume of oxygen to four volumes of nitrogen, practically.

Ques.—In the event of a severe explosion in a mine, what would be your first consideration and duty as mine foreman in charge of the underground operations?

Ans.—The rescue of any possible survivors entombed in the mine. To accomplish this, it would be the mine foreman's duty to organize and equip, in the shortest possible time, a volunteer rescue corps of experienced miners; and having made any necessary repairs to the ventilating equipment, to lead the work of rescue in the mine.

Coal and Coke News

Harrisburg, Penn.

Returns of anthracite tonnage with the value and per capita amount due were completed by the Auditor General, on Dec. 26.

The figures are for the first 6 months of the Rony Act, or from July to December, inclusive, 1913. The report shows for that period that 34,528,794 tons were prepared for market and sold representing a value of $92,144,050.50.

This law imposes an ad valorem tax of 2½ per cent. on coal prepared for market (not including coal run through washeries). Half of this tax goes to the state and half to the county where the coal is mined. The money received by the county is to be distributed under the law to each municipality therein, the proportion received by each city, borough or township being based on the population reported in the 1910 census.

The pro rata share of the money provided for the municipalities is due each and every political division of the bailiwick whether coal is mined within its borders or not. In fact, some municipalities that haven't a pound of coal will receive under this coal tax law more revenue than their present duplicates return. This is one of the features attacked by the operators in the suit now pending.

The tax money is now held in trust by the various coal operators pending the adjudication of the question of constitutionality of the act, Jan. 4 having been set for argument in the Dauphin County courts.

It is contended by the operators that the tax is a special one and cannot under the Constitution be levied; that the tax is assessed after the coal has been shipped out of the state this method being illegal as well as the payment of the money to municipalities in which no coal is mined.

Miners to Formulate Legislation

For the first time in the history of the organization a meeting of the executive boards of five districts of United Mine Workers in Pennsylvania will be held in Harrisburg in January for the consideration of legislation interesting the miners and which is to come before the 1915 legislature. It is planned to have the miners concentrate their energies on having their legislation put through this meeting of the state's law makers.

Already the anthracite district boards in Districts 1, 7 and 9 have held several meetings and outlined the bills they will fight for.

The plan now is to have the two bituminous districts Nos. 2 at Altoona and 5 at Pittsburgh join their influences with the anthracite miners. It is expected that the efforts of the state mine workers will center on the workmen's compensation, employee's liability and child labor. The meeting will probably be called about the 21st of January.

PENNSYLVANIA

Anthracite

Wilkes-Barre—Members of the Tri-District Board of the United Mine Workers of America in session here recently started a movement for the elimination of wooden cages in shafts, and the substitution of all-steel ones. Officials of the board who investigated the recent Tripp accident, believe that similar catastrophes of this kind might be averted by the use of all-steel cages.

At a recent meeting of the Anthracite Conciliation Board, nine petty cases were referred to Umpire Gray, of Philadelphia, and three others acted upon, one of which was decided in favor of the employees, and two sustaining the company.

Scranton—Scranton will receive about $200,000 through the operation of the Roney tonnage tax on coal for 1913, provided, of course, that this measure is held to be legal. It is probable that the 1914 report of coal mining will show somewhat of an increase over that of 1913, with a corresponding increase in the amount of the tax.

Shenandoah—Four miners were badly burned in a gas explosion which occurred at the Stanton colliery on the evening of Dec. 24. Two are thought to be fatally injured while the others may lose their sight. The explosion occurred at quitting time just as the miners were leaving the workings.

Selinsgrove—Northumberland County Commissioners and officials of Coal township have joined in filing an answer to the petition of the Philadelphia & Reading Coal & Iron Co., the Mineral Railroad & Mining Co., and the Lehigh Coal Co., which recently petitioned for an injunction. These firms seek to prevent the enforcement of the collection of coal taxes for 1913, amounting to $73,001.27, which it is claimed is excessive.

Shamokin—After having been idle for some time because the officials of the Pennsylvania R.R. increased the fare of the miners riding to and from work, the 900 employees of the Hickory Ridge and Hickory Swamp collieries recently returned to work. The men received assurances from the railroad officials that the company is willing to lower the rate of fare to the original figure, but before this change can be made it is necessary to receive the approval of the Public Service Commission.

Pottsville—Four collieries were recently closed down for about three weeks for needed repairs and improvements. This throws approximately 1600 men and boys out of employment.

Tamaqua—Being unable to check the fire now burning in part of No. 9 mine, the Lehigh Coal & Navigation Co. has decided to sink a temporary shaft, and in order to prevent a further spread of the flames to flood the workings where the fire exists.

Lansford—The Lehigh Coal & Navigation Co.'s No. 6 boiler house was burned to the ground on Dec. 25. From 3000 to 4000 men and boys are out of employment as the boilers furnished steam for No. 6 Breaker and a half dozen underground operations.

Bituminous

Connellsville—Twelve hundred coke ovens in the Connellsville region that have been banked for some time were relighted Dec. 26. Three hundred and fifty merchant ovens are shortly to be added to the active list, with the prospect that still more will be fired early in January. The weekly production of coke remains, however, around 200,000 tons, but this will probably increase as conditions in the steel industry are improving, and coke operators are consequently hopeful of a better future market.

Point Marion—An explosion in the cellar of the storeroom of the Fancy Hill Coal Co., located between here and Cheat Haven, burned the office building and store to the ground. The loss was approximately $10,000. Employees promptly formed a bucket brigade, but an inadequate supply of water prevented the firefighters from making progress against the flames. Work of reconstruction will be begun immediately.

Latrobe—The United States Steel Corporation has determined that there will be no general reduction of wages by the corporation or none at the first of the year at least. Such decreases in the general wage scale have been considered and have seemed at times imminent, but according to the statement of the officials, the existing scale will be continued for the present at least, and hopes are entertained that improvement in business will be realized shortly.

Brownsville—It is stated that information received from reliable sources indicates that the officials of the Century Coal & Coke Co. are planning to resume operations at their plant near Brownsville at 85 per cent. capacity on or about Jan. 1, or as soon thereafter as is possible.

WEST VIRGINIA

Fairmont—The general store of the New Central Coal & Coke Co., at Baxter, was totally destroyed by fire on the morning of Dec. 21, entailing a loss of about $25,000. John Jackson, manager of the store, and his family were rescued from the third floor of the building with difficulty, being compelled to descend ropes made of blankets, comforts, etc. The water plugs near the building were frozen up, which handicapped the fire department to a considerable extent. The origin of the fire is unknown.

Gary—Mine Rescue Car No. 8 is now at Gary and has started in on a successful training campaign at that point. Every possible coöperation to the car's crew has been given, and 55 men are taking a complete course of training in mine-rescue and first-aid work. This large number will necessitate an extension of the car's stop at this point, and the car will probably remain here until Jan. 4, after which it will proceed to Davy.

Kingwood—It is freely intimated around this vicinity that the Elkins mines as well as those located elsewhere along the Morgantown & Kingwood R.R., will resume operations shortly after Jan. 1. These mines have been closed or working only half time for several months, and when in operation give employment to several hundred men, all of whom are anxious to see the mines start up again.

ALABAMA

Birmingham—The Alabama Coal Operators' Association has been advised that the Interstate Commerce Commission has suspended the advance rate on coal from Alabama mines to Memphis, New Orleans and other points in the Mississippi valley, which the railroads had petitioned to have put on Jan. 1. The advance asked for was from 15 to 30 cents per ton over present prices. A date for a hearing before the Commission will be fixed early in the year. Pending the investigation the old rate will remain in force. The railroads that joined in the petition were the Illinois Central, the Louisville & Nashville, the Mobile & Ohio and the Frisco. The operators and shippers are encouraged and believe they will win the fight on the merits of their case when a hearing is given.

KENTUCKY

Harlan—This city, according to the Commercial Club, is making a more rapid growth than any other community in Kentucky and is guaranteeing an interest of 6 per cent. on an investment of $25,000 for a water works to any person who will install such a plant. The coal resources of the county explain the city's growth. There are 12 mines already producing while 8 others are to be opened in the immediate future.

St. Charles—The Carbondale Coal Co., with mines two miles north of here, has suspended operations. The reason for this suspension has not been given but report connects it with the "Possum Hunters" activities of several weeks ago when four white men were shot at this camp and all the negroes driven away.

Earlington—The St. Bernard Mining Co. reports for the week ending Dec. 19 the best week in its history in this district, shipments having totaled 887 cars of coal and 36 cars of coke.

Barbourville—There has been a large increase recently in the number of electrically operated mines in the Knox County field. Several of the operators took advantage of the dull period of the last few weeks to install electrical equipment, in preparation for greatly increasing their outputs.

OHIO

Columbus—J. M. Roan, chief deputy and safety commissioner of mines of Ohio, has recently issued Bulletin No. 12 calling attention to three fatal and one serious accident in Ohio mines during the past month. In each case remarks are made showing how the accident in question could have been prevented. The accident was the fault of the miner in every case.

INDIANA

Boonville—The Sunlight Coal Co. has ready for use a fourth large stripping machine, and expects when this is working properly to be able to load more than 50 cars of coal per day. The dipper holds about 1½ tons of coal, and cars can be loaded on an average of one every 15 minutes. Three other machines are now in use, two of which are used to strip the coal, while the other loads it.

ILLINOIS

Pana—Fire has broken out again at the Taylor Springs mine west of here, and the operation is in a serious condition. A mine fire started 18 months ago, and it was supposed that it had been confined to a section that had been bricked and cemented in.

Belleville—On account of the large number of mines of this section that have been idle on account of no market for their coal, the mayor and other business men of the city held a meeting to complain to the Interstate Commerce Commission, asking it to fix rates on coal from Belleville to interstate points, so that the local mines can operate.

Princeton—A judgment for $18,500 was recently awarded in the Superior Court of Cook County in favor of Fred De Filippe, of Spring Valley, who lost his leg about four years ago in the No. 1 mine of the Spring Valley Coal Co. The coal company has, however, taken an appeal to the Supreme Court.

Harrisburg—Through the petition of citizens, the Commercial Club and miners' organization, the O'Gara Coal Co. recently agreed to start Mine No. 4. Mines Nos. 3 and 4 have been idle for many months, and the employees at these operations who were thrown out of work have been reduced in some cases to actual suffering. All idle men who were formerly employed will be given preference in the work.

COLORADO

Denver—The gradual withdrawal of Federal troops from the Colorado coal fields, where they have been on strike duty since April last, will begin shortly. The troops statfoned in Routt County will be the first to go. These will be followed by those in Boulder, Weld and Freemont Counties. It is intimitated that some time may elapse before all the Federal forces now in Las Animas and Huerfano Counties in southern Colorado will be withdrawn.

FOREIGN NEWS

Pictou, Nova Scotia—Thomas Blackwood, deputy inspector of mines, and James Brown, mine superintendent of the Acadia Coal Co., were killed in an explosion in Allen's Shaft No. 1 recently. Alexander Sutherland, manager of the mine, and Neil McLane, a foreman, were also in the mine at the time of the explosion, and nearly lost their lives.

PERSONALS

W. C. Bonham has been appointed trustee for the American Coöperative Coal Co., who recently filed a petition in bankruptcy at Birmingham, Ala.

George G. Crawford, president of the Tennessee Coal & Iron Co., has returned to Birmingham from New York after attending a meeting of presidents of subsidiary organizations of the Steel Corporation. He says indications point to a general revival of business.

Neil Robinson, consulting engineer, of Charleston, W. Va., and receiver for the LaFollette Coal, Iron & Ry. Co., has been confined to his home in Charleston for the past three weeks with valvular heart trouble. He is improving, but will not be at LaFollette for a few days.

The vacancy created by the resignation of Fred W. Minton as sales agent of the Philadelphia & Reading Coal & Iron Co. at Detroit has been filled by the appointment of William A. Reed, who has represented the same company for several years in Ohio. The changes take place on the first of January.

James B. Neal, president and general manager of the Buck Run Coal Co., recently had suit brought against him by one of the hoisting engineers of the colliery, the charge being that the hoisting engineers were forced to work more than eight hours per day, which is the working time provided by law.

S. C. Van Norman has resigned his position as sales agent of the Pittsburgh-Westmoreland Coal Co. at Buffalo. He has been with the company in this territory for four years. No successor has been appointed, but the office will be conducted for the present by B. F. Mills, who is with the company at Cleveland.

OBITUARY

Col. Eugene Zimmerman, of Cincinnati, O., former president of the Cincinnati, Hamilton & Dayton R.R. Co., and widely known as a financier, railroad magnate and capitalist, died suddenly in Cincinnati on Dec. 20, at a club where he was staying. Death was due to a hemorrhage brought on by undue exertion during an illness. Col. Zimmerman was born in Vicksburg, Miss., in 1845, and was a veteran of the Civil War, serving in the Union navy and reaching the rank of commander. After the war he engaged in railroad construction, and was subsequently interested in many large deals involving railroad properties in the Middle West.

CONSTRUCTION NEWS

Blackey, Ky.—It is announced here that the Rockhouse Realty Co. will make a big coal development on Rockhouse Creek above here, expending thousands of dollars in the work.

Glasport, Penn.—It is stated that extensive improvements costing upward of $100,000, and involving the employment

of more than 100 men, are to be made by the Allegheny Byproduct Coke Co., the work to be started about Jan. 15.

Jenkins, Ky.—The Penny Coal Co., starting a new development on the Sandy Valley & Elkhorn R.R., below here, will increase its capital stock the first of the year and will also increase the output. As a result there will be a big increase in the working force.

Baker, Ky.—White L. Moss, M. J. Moss and others, after leasing the K. S. Potter coal land tract near here, will organize the Yount's Fork Coal Co. for early development. The new operation will be on the Yount's Fork Branch of the Lexington & Eastern R.R. White L. Moss will be manager.

Benscreek, Penn.—A structural feat will be attempted by the Hughes Coal Co. during January when an effort will be made to build a steel tipple, one of the largest in this part of the state, in 30 days. The reason for this rush is because the miners, about 200 in number, will be made idle while the work is going on.

Edwardsville, Ill.—The Mt. Olive & Staunton Coal Co. will shortly install one of the largest coal washers in southern Illinois. This plant will cost approximately $70,000, and will have a capacity of 1000 tons per day. It will handle coal from mines as far north as Mt. Olive, making grades ranging from slack to egg sizes.

Whitesburg, Ky.—The Mineral Development Co. general offices, Philadelphia, Penn., is preparing for initial developments above here in Letcher County, to start Jan. 1, although plans are not quite complete. J. L. McCormick, Whitesburg, Ky., will be manager of the new operations. It is said a good sized industrial and mining town is planned.

Holt, Ala.—The second barge which will be used in the barge line to be inaugurated by the Pratt Consolidated Coal Co. has been completed. The third will be finished soon. Mr. G. B. McCormack, president of the company, states that he is negotiating for the purchase of a tow boat to be ready as soon as the completion of lock 17, which will be in two or three weeks.

Greensburg, Penn.—The Export Coal Co., of which J. S. Pates, of Monongahela City, is the president and general manager, will in the early spring begin the operation of coal land directly south of Trafford and Cavittsville and north of the Southern Turnpike between East McKeesport and Irwin. It is anticipated that about 400 first-class American miners will be employed.

Lonaconing, Md.—The Maryland Coal Co., of New York, will improve its Lonaconing plant, developing the Tyson bed in the Georges Creek region. It is stated that this firm will install electrical and improved equipment for an ultimate capacity of 1000 tons of coal per day, and upon the completion of this work will probably develop about 1000 acres of fireclay property at Mt. Savage, Md.

Whitesburg, Ky.—Louisville & Nashville engineers are rapidly locating a 10-mile branch of the Lexington & Eastern R.R. from Blackey, in the southern end of Letcher County, up Rockhouse Creek into rich coal and timber fields. The Mineral Fuel Co., the Swift Coal & Timber Co., the Rockhouse Realty Co. and others own large boundaries on Rockhouse and it is expected that developments aggregating millions of dollars will be started in the near future.

Columbus, Ohio—With the passage of an act by the National Congress authorizing the building of a bridge across the Ohio River at Sciotoville by the Chesapeake & Ohio Northern R.R. Co., all obstacles in the way of building the line from Portsmouth to Columbus have been removed. The line in question will be 97 miles long and will shorten the route from the Virginias to the lakes by 102 miles. It is the intention to construct the road at once. The Kentucky terminus of the bridge will be at Limeville, 8 miles above South Portsmouth.

NEW INCORPORATIONS

Richmond, Va.—It has been announced that the West Virginia Coal Co. has taken over the Atlantic States Coal & Coke Co. The principal offices will be in this city, while the Western business of the latter company will be handled at the Cincinnati office of the West Virginia firm.

Morgantown, W. Va.—A charter was recently granted to the Wilfong Coal & Coke Co. This firm has an authorized capital of $10,000 and will operate in the Grant District of Monongahela County. The incorporators are John, L. C., and Edward Wilfong, of Fairmount, and W. L. Boughner and Thomas Ray Dille, of Morgantown.

INDUSTRIAL NEWS

Columbus, Ohio—A meeting of the executive board of the Michigan-Ohio-Indiana Coal Association will be held some time in January, the place and date to be announced later. At that time the matter of fixing a place for the 1915 convention of the organization, to be held in June, will come up for discussion.

Jackson, Ohio—Because of the fact that 18 locomotives used by the Detroit, Toledo & Ironton R.R. leased from the New York Central, the Pennsylvania and the Norfolk and Western have been recalled by their owners, the coal traffic on that line is demoralized. This is especially true of the yards at Jackson.

Wheeling, W. Va.—Following the lead of the Lorain Coal & Dock Co. which boarded up the entrance of its mine at Blaine, Ohio, a short time ago, a number of other big operating companies in the eastern Ohio fields are said to be making preparations to close up their workings. A number of these firms have already sent away their livestock.

LaFollette, Tenn.—The coal land lease secured three months ago by C. H. Thompson, of Darbyville, Va., and W. J. von Borries, of Louisville, Ky., from the Haley Coal Co., on First Creek in Perry County Ky., has been surrendered to the lessors on account of the inability of the lessees to finance the proposition as stipulated when the lease was taken.

Harrisburg, Penn.—The auditor's general department recently mailed 150 blanks to anthracite coal producers, corporate, partnership and individual, upon which to make reports on their tonnage for 1914 for the purpose of levying the state tax on anthracite. The question of constitutionality of the law is now in the hands of Dauphin County Court for determination.

Pittsburgh, Penn.—Although the stage of the river was falling somewhat, two million bushels of coal which had accumulated in the local harbor since the suspension of navigation in June were sent south Dec. 23. Five of the largest tow boats of the Monongahela River Consolidated Coal & Coke Co. were assigned to take out this cargo, the river was then clear of ice.

Washington, D. C.—Increases in the freight rates on coal and coke in carload lots from mines in Alabama, Kentucky, Tennessee, Virginia and Illinois, to Memphis, Tennessee, New Orleans, Louisiana and destinations in other states were recently suspended by the Interstate Commerce Commission until Apr. 30 next. The increases average 15c. per ton on coal, and from 10c. to 50c. a ton on coke.

Beaver, Penn.—Two coal boats, part of the tow of the steamer "W. K. Fields" which left Pittsburgh with a fleet for southern waters a few days ago, broke in two above Industry recently and sank. The boats contained 40,000 bushels of coal. They grounded on the Wolf Run bar, and broke in two after being released. They were owned by the Monongahela River Consolidated Coal & Coke Co.

Fayetteville, W. Va.—The New River Co. during the fiscal year ended June 30, 1914, produced nearly one and one-half million tons of coal, the actual figures being as follows: Beckley mine, 92,927 tons; Collins, 114,820; Cranberry, 180,419; Dunn Loop, 192,040; Harvey, 161,153; Mabscott, 95,647; MacDonald, 59,618; Prudence, 136,262; Stuart, 114,933; White Oak Fuel, 347,435, making a total of 1,485,254 tons.

Louisville, Ky.—Ice in the Ohio River has been seriously interfering with shipments of Pittsburgh coal by the Monongahela Consolidated Coal & Coke Co. This ice has been disgorged into the Ohio from the Monongahela River and has been of sufficient thickness to make shipments inadvisable. Large cargoes of coal, however, were sent ahead of the ice and conditions have since improved so that shipping can be resumed.

Winchester, Ky.—Both the Louisville & Nashville and the Baltimore & Ohio railroads are making extensive preparations to handle the 80 million tons of coal which it is reported the Consolidation Coal Corporation has contracted to deliver in the next six months. It is stated that every one of the company's mines will be put in operation and that deliveries, presumably to one of the belligerent European powers, will be begun at once.

Washington, D. C.—Regulations governing the coal mines on Indian land were recently promoted by Secretary Lane with the object of decreasing fatalities among miners. On and after Jan. 1, 1915, such mines will be required to use either permissible explosives or electric firing systems operated from outside the mine. Provision is made for extension of time

in compliance with this order, where a hardship would be worked upon the mine owners.

Washington, D. C.—Officials of the Department of Justice were apparently not greatly surprised when they heard of the dismissal of the Lehigh Valley R.R. case by Judge Hough in the District Court. An appeal will be taken from this decision, and an effort made to have the case brought before the Supreme Court during this term. The necessity of preparing a brief of the record of the case, however, may consume a considerable length of time.

Erie, Penn.—The Erie Pump & Engine Works recently consolidated with the Northern Equipment Co., and the name of the combination will be the Erie Pump & Equipment Co. This firm will occupy the property of the Erie Pump & Engine Works, and John H. Dougherty who, for a number of years, has been in the employ of the Jeamsville Iron Works as designer of centrifugal pumps, has been engaged to take charge of the designing of pumps for the company.

Reading, Penn.—It has been learned that since the reduction of freight rates which has been ordered between the mines and Philadelphia, a movement will be inaugurated all along the Reading railway system to secure a similar reduction in rates on hard coal on the ground that the reduction granted to Philadelphia is discriminatory. It is the belief that the matter will be presented to the proper state authorities soon after the first of the year.

Huntington, W. Va.—As a result of the recent cold weather, the coal business on the Chesapeake & Ohio R.R. has increased and traffic is now much congested. Despite this rush, however, the amount of coal loaded so far this month is not as great as that loaded during the same period of last year. Between Hinton and Newport News terminals are congested with coal cars, thousands of which are standing on side tracks rendering it difficult to handle other classes of traffic with dispatch.

Cincinnati, Ohio—The court of appeals for this district has affirmed the judgment rendered some time ago in the amount of $26,650, in favor of the Campbell Creek Coal & Coke Co. against the Cincinnati Gas, Coke & Mining Co., now the Reliance Coal & Coke Co. The suit was brought on a contract made in 1907, by which the defendant agreed to take 225 barge loads of coal from the Campbell Creek company, the suit being brought on an alleged breach of the contract in 1908. The amount asked was $55,643.06.

San Francisco, Calif.—Word has been received from San Antonio, Argentina, by Hind Rolph & Co., to the effect that the four-masted bark "Drummuir," flying the British flag was sunk by the German cruiser "Leipsic" a few days before the latter was destroyed with the German fleet off the Falkland Islands. The "Drummuir" owned by this firm left Swansea some time ago, and would have arrived here in February had she not been intercepted by the German ship. She was loaded with 2780 tons of anthracite coal.

New York, N. Y.—The Gifford-Wood Co. will shortly establish a branch office in the Hudson Terminal Building, 30 Church St., occupying suite of rooms No. 1038. This office will be managed by A. W. Berghoefer, who will have associated with him Joseph A. Boucher, both being engineers of ability. The territory of this office will include Westchester County, N. Y., the whole of New Jersey, the southern part of Connecticut, and the southeastern part of Pennsylvania; also the Southern States east of the Blue Ridge Mountains.

Denver, Colo.—According to the preliminary draft of the annual report of the state coal mine inspector, James Dalrymple, there has been a decrease of 1,183,577 tons in the amount of coal mined in Colorado during 1914 compared with that produced in 1913. It is estimated that a total of 8,085,362 tons were mined during 1914 as against 9,286,939 tons produced in 1913. The strike, European and Mexican wars, and the closing down of large steel mills in Pueblo, together with a general business depression, are some of the causes for this decrease.

Philadelphia, Penn.—In order to conserve the assets of the Colonial Coke Co., which owes Irish Bros. $96,570 for money loaned, the receivers of the latter firm recently brought action in Common Pleas Court No. 1 to appoint a receiver for the former company. In addition to the amount owed Irish Bros., the Colonial company owes to its employees $2358.45, while the Cambria County Coal Co., lessor of the mine held by the Colonial company, have a claim for $11,236. The assets consist of a lease on coal lands in Cambria County, and mining appliances valued at $20,000.

Harrisburg, Penn.—It is stated that recommendations for embracing under the authority of the state Department of Mines, all quarries, iron ore, and other mines, oil and gas wells and other operations will be made to the next legislature in a report which will be drafted under the authority of a legislative resolution passed in 1913. This measure directed the state chief of mines to make an inquiry into the subject, and it is probable that recommendations will be made that these mines and wells be brought within the scope of a special act, and that regulatory legislation be enacted.

Columbus, Ohio—The New York Central Lines have followed the example of the Baltimore & Ohio R.R. Co. in issuing new reweighing rules which are better suited to the interests of coal shippers and retailers. The new rules are about the same as issued by the Baltimore & Ohio and provide for reweighing upon the request of the consignee at the nearest scales to destination, the cost to be $3 in case the shrinkage is less than 1000 lb. In case the shrinkage is more than 1000 lb. the cost of reweighing is to be paid by the railroad company. The cost of reweighing at the point of destination is only $1.

Birmingham, Ala.—After a long delay on account of lack of funds, the 1913 annual report of Chief Mine Inspector Nesbitt has been issued. This report contains a directory of the mines in Alabama, the seams of coal, number and kind of openings, whether drift, slope or shaft, number of employees, mode of ventilation of each opening, production of each mine, number of days worked, price paid per ton for mining, states whether machine or pick mined, and the railroad connections. The number of coke ovens are listed, together with the output of coke, as well as a description of each mine, and much valuable information regarding accidents, etc.

Philadelphia, Penn.—The State Railroad Commission of Pennsylvania issued its formal order Dec. 28, covering the reduction which was made in the rates of freight to Philadelphia. This becomes effective, Jan. 12, and the various railroads have been requested to furnish the commission with revised tariffs. Officers of the various railroads still maintain silence as to their attitude in the premises, but it is not expected that the rates will be actually established, without some protest on their part in the courts. The decision will undoubtedly be fought to the bitter end. It is expected that there will be virtually no change this winter in the prices of coal at retail, and even if the new rates should be upheld, it is doubtful if the consumer would receive the full benefit thereof.

Columbus, Ohio—A peculiar situation has arisen in Columbus over the administration of the Ohio Workmen's compensation law, which affects every coal dealer in the state. It has been the custom among dealers to furnish a man to wheel coal from the sidewalk to the basement or other storage place. These men are paid by the customer and are not in any sense working for the dealer. Recently a man so employed injured a finger and immediately brought complaint against the dealer, who was not a contributor to the board of awards and thus had to assume the risk individually. It required the employment of an attorney and the taking of depositions to convince the state board of awards that the man was employed by the consumer and not by the dealer. Secretary B. F. Nigh, of the Michigan-Ohio-Indiana Coal Association, advises that all dealers who furnish such a man should impress it upon the workman, as well as the customer, that he is not employed by the dealer.

Montgomery, Ala.—The State Railroad Commission has just reached its decision regarding the proposed rates petitioned for by the railroads out of Birmingham, as follows: The Commission issued orders requiring the railroads to withdraw all special rates not open to the public, except those to pig-iron furnaces and steel plants; denied petitions of Montgomery, Dothan and Alexander City for reductions in coal rates from Birmingham, and adopted Southern Classification No. 40 of the Interstate Commerce Commission which puts intrastate rates in Alabama on a uniform basis with interstate rates. Withdrew its interdiction for a lower rate on coal from Birmingham to Selma; denied petitions of railroads for an increase in rates on coal from mines to Birmingham. In the commodity cases the railroads asked for increases ranging from 10 to 25%, and in granting a 10% increase the Railroad Commission stipulated that it was to meet present conditions only, and would not be effective after June 30, 1915. On rehearing the Selma coal-rate case the Commission decided to reëstablish the original rate of $1 per ton. A rate of 80c. per ton had formerly been established by the Commission, based on the rate to Decatur being 75c. Investigation showed, however, that the Decatur rate was allowed on account of being a highly competitive point with other districts. Permission was granted to the Louisville & Nashville R.R. to withdraw certain building material rates to coal and ore mines and coke ovens. This still leaves the Interstate Commission decision as far as it pertains to shipments to other states, and the operators are anxiously waiting the decision.

Coal Trade Reviews

General Review

Colder weather forces the large anthracite companies to draw on their storage piles. Bituminous trade continues heavy, with sales agents pushing hard to place the current production. Substantial improvement noted in the Middle West.

The long continued cold snaps have created an active situation in the retail anthracite trade, but the wholesale business is still holding back. Supplies are plentiful, though the large companies have been drawing on their stocks. Delays occasioned by freezing coal caused temporary anxiety in some quarters, but on the other hand the dealers reduced their buying over the closing days of the year and there has been no shortage of consequence at any time.

Large stocks, weak prices and excessive surpluses in all directions mark the opening of the new year in the Eastern bituminous trade. The colder weather, which has started coal moving in certain restricted channels, and more or less indefinite reports of a turn for the better in industrial circles after the first of the year, are the only encouraging features in the situation. The surpluses at the main distributing centers are probably a shade less than for some time, and quotations on prompt sales a trifle steadier, but the demand is only spasmodic while only the thinnest pretense is made of maintaining the circulars and sales agents are pushing hard to place the January and February tonnage. On contracts for the new year, the producing interests are holding out determinately for the same prices as last year, and most of the business coming up so far has been closed at these figures, though very slight concessions are occasionally noted.

In the Pittsburgh district, a scarcely perceptible improvement in the demand is noted, due entirely to the additional tonnages required because of the colder weather. As a result the market on free coal is a trifle steadier, and there are encouraging reports of increased working schedules to become effective at many of the mills this month. At the moment, business is confined entirely to routine orders on regular contracts, and spot coal is the only size in which buyers are displaying any interest. The severe cold weather caught the dealers in Ohio with unexpectedly low stocks with a result that there has been a rush of orders, with some of an urgent character. A better sentiment is also noted among the steam consumers, who are now placing orders with every apparent confidence.

In the Southern market current prices continue below the regular circular, but the cold weather and storms have created a demand for immediate shipment; the holiday curtailment and better feelings prevailing regarding the industrial outlook have caused a moderately improved tone in the situation.

The severe cold weather has toned up the Middle Western situation in an impressive manner. Prices are notably stiffer, while mine operations are apparently up to full rated capacity with the coal being absorbed as rapidly as it is mined. The predominating feature in the situation is the heavy demand for steam coal from Chicago which is apparently being met with some difficulty. Higher prices are to be expected most any time from now on.

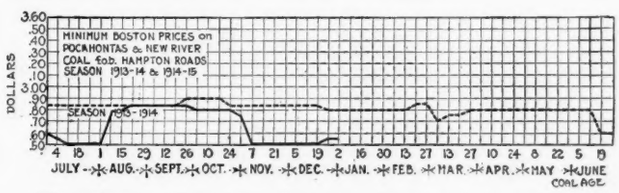
ATLANTIC SEABOARD

BOSTON

Year opens with a surplus of coal at all points. Contract demand slack and Pocahontas and New River interests pushing hard for business. Pennsylvania grades dull with occasional forced concessions. Anthracite in better demand.

Bituminous—There is no improvement in the Pocahontas and New River situation beyond what was reported a week ago. The year opens with dubious legacies from 1914—large stocks, weak prices, a surplus of coal at every loading port, and an industrial situation that is decidedly unsatisfactory. Contract demand is still very slack and there is nothing more to the spot market than has been the case for the past three or four months. The agencies are actively canvassing for business and strong efforts are made to place the January and February output. On such business there is apparently no thought of netting $2.85 f.o.b.; it is a question of getting the orders and making the price satisfactory to the buyer. There is less coal on the market at the various distributing points than for several weeks and prices on cars here are a shade firmer, but there is a lack of snap, to the trade in general.

Nothing is reported so far of the attitude Southern shippers are to take toward yearly contracts. With a certain amount of tonnage already closed at around $2.70 f.o.b. for delivery through 1915 the operators will have to have the situation more firmly in hand than they have at present to secure a gross price anything like $2.85 at Hampton Roads. If it turns out that this price can be firmly held as the contract basis it may be predicted with confidence that certain of the quality grades from Pennsylvania will be actively in the field for what tonnage can be had.



The shippers of Georges Creek are beginning to make good their arrears on shipments, the shortage being made up through the use of anthracite barges from Philadelphia temporarily diverted to the bituminous trade.

There is practically no change in prices on the Pennsylvania grades. The demand is only spasmodic and the market still much restricted. Occasional concessions are made to move distress coal at the shipping ports, but for the most part coal is coming down only on firm orders.

Anthracite—The low temperature of the past fortnight has given an impetus to retail trade and the shipping companies in consequence have more orders in hand. January is looked to for a moderate hard coal tonnage in New England.

Current quotations on bituminous at wholesale are about as follows:

	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*.....	$0.90@1.50	$1.15@1.65	$1.67@1.77	
Philadelphia*.....	2.15@2.75	2.40@2.90	2.92@3.02	
New York*.....	2.45@3.00	2.70@3.20	3.22@3.32	
Baltimore*.....	.....	.....	2.85@2.95	
Hampton Roads*.....	.....	.....	.....	$2.55@2.75
Boston†.....	.....	.....	.....	3.63@3.78
Providence†.....	.....	.....	.....	3.48@3.73

* F.o.b. †On cars.

NEW YORK

Bituminous mines are working more steadily. Situation more hopeful but prices still unchanged. Anthracite buying slowed down over the year-end in spite of the cold weather.

Bituminous—The demand for bituminous coal has improved, due to the long-continued cold weather. But it has not improved to an extent that would warrant any increase in prices, and coal is still selling at or about the cost of production; however, this is a distinct improvement and there is a still better feeling as to the future.

Mines are working more steadily; those on three-day schedules are now working nearer five, and there are others that are on full time. On the other hand those producing the poorest grades have not yet started up or at least are doing little, if anything. It is possible that present conditions will still improve; at least it is not expected that they will be less favorable. There will, from now until April, be a natural restriction on account of the large number of holidays, which are usually celebrated by all classes and nationalities. There is also likelihood of a shortage of railroad cars. There has already been a shortage on one of the roads due rather to a lack of motive power causing a delay in movement, but the general effect is the same as mines are unable to work steadily. Labor is still plentiful, but there is a feeling that this will only continue until the steel works resume full time when the mines will encounter a shortage.

A little contracting has already been done, and last year's prices have ruled in most instances. Only slight concessions

have been made, as operators feel the absolute necessity of securing these prices. The situation appears more hopeful to most concerns. Prices continue unchanged as follows: West Virginia steam, $2.35@2.55; fair grades, Pennsylvania, $2.55@2.65; good grades of Pennsylvania, $2.70@2.80; best Miller Pennsylvania, $3.10@3.15; Georges Creek, $3.15@3.25.

Anthracite—There has been a decided improvement in the hard-coal trade during the past week, and dealers are all very busy. They have all ordered new supplies and the docks are having all they can do to load the required cargoes because the coal is badly frozen and the capacity of the piers is reduced about one-half.

Broken coal is made only in sufficient quantities to take care of contract business, and there is little to be said about any special market condition. Egg is plentiful; in fact, it is troublesome and is being offered as low as the April circular. Stove is very active and is being taken from storage in large quantities; there is no premium or cut in circular prices. Chestnut is strong and shipments in the line trade slow. There is sufficient in storage to take care of an active demand at tide, and large quantities are being picked up.

Pea is very scarce, but no premiums are being paid. Buckwheat is short in the better grades and prices are firm; there is sufficient of the cheaper qualities but prices have firmed up materially from recent low figures. Rice and barley are short in all grades and are holding firm.

The market is quotable on the following basis:

	Upper Ports		Lower Ports	
	Circular	Individual	Circular	Individual
Broken	$5.10	$4.60@5.10	$5.05	$4.55@5.05
Egg	5.35	5.00@5.35	5.30	4.80@5.30
Stove	5.35	5.25@5.35	5.30	5.20@5.30
Chestnut	5.60	5.45@5.60	5.55	5.40@5.55
Pea	3.55	3.45@3.55	3.50	3.35@3.50
Buckwheat	2.80	2.50@2.80	2.50@2.75	2.15@2.75
Rice	2.30	2.20@2.30	2.00@2.25	1.35@2.25
Barley	1.80	1.60@1.80	1.75	1.25@1.75

BALTIMORE

The coldest December weather in history of local weather bureau booms consumption of fuel. Much difficulty with frozen coal. Not much improvement in soft-coal situation at mines.

The colder weather has forced a number of the smaller consumers to get in more coal, and domestic sizes of anthracite are in healthy demand. Ice-covered streets caused considerable trouble with wagon deliveries, and the motor truck again demonstrated its superiority in such conditions. Falls of snow throughout a large part of this and neighboring states sent much of the fuel to this city in a badly frozen condition and the usual troubles with thawing resulted. This is particularly true of the smaller dealer who has not the facilities for direct dumping in many cases.

The holidays brought a nearly complete shut-down in many mining districts, but unlike previous years, it was not wholly unwelcome. Gas coals of West Virginia are sluggish, three-quarter being offered at 85c. and run-of-mine around 75c. Steam coals run from 85 to 90c. at the mines. Pennsylvania coals of better quality are probably the best feature here, as the local demand, outside of that for export fuel, is for the better grade Pennsylvania products. From medium to best they are bringing from $1.15@1.35.

The export trade is not rushing as some had hoped. Isolated charters are announced from time to time, but there is not the same busy aspect to the piers that characterized September and October loading. The bunker trade holds up exceptionally well, however, under an immense grain movement.

BUFFALO

There is the customary light movement during the holidays. Much expectation of improvement after Jan. 1. Slack continues to advance. Cold weather helps anthracite.

Bituminous—Business now is confined to routine orders on regular contracts, which must be filled anyhow. Some of the larger shippers expect a decided turn for the better after the new year is well under way, but others refuse to hold out hopes as yet.

Slack coal is still strong. It has been scarce for some time and there is no improvement in the supply, so a slight increase in the demand will insure a good trade. There are low-price mine agents here, which indicates that they are not able to sell their coal near home and are willing to bring it here for almost anything the consumer will offer. An increase in consumption would scarcely drive them off the market.

At the same time there is hope of a limited revival in demand that will give the miners work and stop the complaints of despondent jobbers. The general belief is that there will be a better outlook in the next 30 days. The Canadian trade is improving slowly; England is calling on the Dominion for all sorts of manufactures and many idle factories are starting up.

The slight strengthening of the market does not yet warrant any change in quotations which remain on the basis of $2.80 for Pittsburgh lump, $2.70 for three-quarter, $2.55 for mine-run and $2.15 for slack. Allegheny Valley prices are 25c. lower than Pittsburgh.

Anthracite—The demand is not heavy, but has increased since the weather turned colder. About the usual amount has been sold for the year and with the exception of a surplus of egg coal, the trade is in a normal condition. Some shippers say that the cold weather has not helped their rail-line trade to any extent. An effort is being made to load considerable anthracite into vessels before the ice in the harbor becomes heavy, but with this weather the Lake is fast closing and it will be difficult to navigate the inner harbor soon, though the presence of a large amount of grain to be unloaded this winter makes it necessary to keep the channels open. Nobody remembers a previous December when the harbor and Lake were so blocked by ice.

A winter, such as this promises to be, will clean up the Upper-Lake docks and make business Westward brisk in the spring. There is a good demand for independent anthracite, considerably more of it being sold in this market than formerly. Prices are on a par with the regular circular.

PHILADELPHIA

Anthracite situation shows little or no improvement over last week. Seasonable weather stimulates retail trade, but has not as yet been reflected in the wholesale market. All sizes in good supply. Bituminous slightly improved.

Anthracite—The past week was all that could be desired from a coal-burning standpoint, but nevertheless it failed to help the market as much as was anticipated, particularly in the wholesale trade. Business is fairly brisk, but dealers all have good stocks, and there is no difficulty at all in securing prompt shipments. Even stove size is in easy supply. The demand at the present time seems to be centered on chestnut, pea and buckwheat sizes, and with the curtailed work at the mines, owing to the holidays, some of the companies have drawn on their stocks to meet the current demand. Broken and egg still continue in a rut, and very low prices are being quoted by the individuals in their efforts to move egg; 50c. off circular on consignments to rail points nets the operator a fairly good return, and considerable business is being done on this basis. The demand for broken is in marked contrast to what it was a year ago; at that time many operators were turning down business for this size, but such is not the case now. The price of this coal has advanced considerably during the last three or four years and quite a number of large contracts that formerly fell to the large companies are now taken care of by the individuals.

Prices at tidewater rule about as follows:

	Circular	Individuals
Broken	$4.75	$4.50
Egg	5.00	4.75@4.85
Stove	5.00	5.00
Chestnut	5.25	5.25

Bituminous—This is the contract season of the year for both anthracite and bituminous, and the latter seems to show slight indications of an improvement, but it is so gradual that it is almost impossible to record the changes that have taken place from one week to another, though there is undoubtedly a better disposition in the trade. Prices have not perceptibly advanced, but there appears to be a stronger demand.

OCEAN FREIGHTS

Chartering light but demand even more urgent and rates still advancing.

The freight market is even higher than a week ago. Although the demand for steamers for grain, cotton, general cargo, etc., is as urgent as heretofore, even at advanced rates, the number of charters has diminished, owing to the scarcity of tonnage and the Christmas holidays. It is difficult to interest owners in export coal, and it is almost impossible to secure cable refusals, but with export coal orders firm in hand, we are occasionally able to close charters and contracts.

To	Rate	To	Rate
Havana	$1.75@2.00	Guantanamo	$2.25@2.50
Cardenas or Sagua	2.25@2.50	Demerara	4.00
Cienfuegos	2.25@2.50	Bermuda	2.25
Port of Spain, Trinidad	2.50@2.75	Vera Cruz	2.50
St. Lucia	2.50@2.75	Tampico	2.50
St. Thomas	2.25@2.50	Rio	6.00@6.60
Barbados	2.50@2.75	Montevideo, Buenos Ayres or La Plata	5.40@6.00
Kingston†	2.00@2.25	Mediterranean	9.60
Curacao	2.00		
Santiago	2.25@2.50		

*About. †Small boats to Kingston $2.25@2.50. W. W. Battie & Co.'s Coal Trade Freight Report.

HAMPTON ROADS

Shipments light and prices unchanged. Rates made for 1915 bunker contracts.

There have been a few large coastwise shipments as well as some movement foreign, but neither of these has been as heavy as might have been expected at this season of the year. The Christmas holidays have also interfered to some extent with the dumpings.

The demand for both coastwise and export shipments is still light and the greater part of the movement confined to contracts. Prices for prompt shipment remain unchanged. Bunker rates for supplying coal under contract during 1915 have been fixed at $3.30 plus trimming, and is somewhat of a change from the prices for the last two years.

Cold weather has caused the demand from retail dealers to increase somewhat although to no great extent. The call for New River and Pocahontas nut for domestic coal seems to be gradually improving, and so far as can be ascertained it is giving entire satisfaction.

OCEAN CHARTERS

Coal charters have been reported by the "Journal of Commerce" as follows:

Vessel	Nationality	From	To	Tons	Rate
Egda	Norwegian	Baltimore	Colon	1610	
Marie O. Teal		Philadelphia	Porto Rico	682	
Evelyn W. Hinkly		Philadelphia	Galveston	558	$1.10

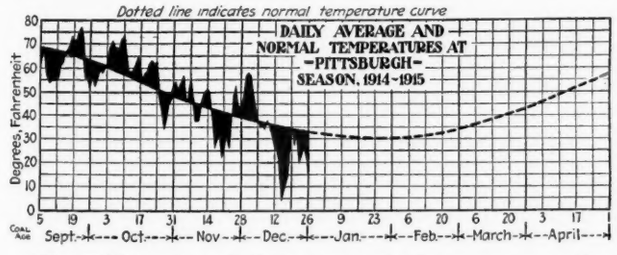
Note—Steamers are indicated by **bold face** type, all others being schooners.

OHIO VALLEY

PITTSBURGH

Increased demand for coal due to cold weather, and prospective further increase in manufacturing operations. Production about 50% of capacity against 40% formerly, and prices slightly steadier.

There is a slightly improved demand for coal nearly all along the line. The retail demand has been good for three weeks, and as the weather continues seasonably cold there is no prospect of its abating. The demand from railroads, power and manufacturing plants generally has proved decidedly better in the past fortnight, and the improvement is attributed by producers not to increased operation but to the greater amount of coal required to produce results in cold weather. A further increase in demand is also expected as reports are that the steel mills are going to run at a considerably fuller rate in January than in December. To some manufacturing consumers there has been a temporary curtailment in shipments, as a stoppage was ordered from the day before Christmas to the following Monday.



The Pittsburgh coal district as a whole is now operating at about 50% of capacity, as against not over 40% a fortnight ago. The market for free coal is a trifle steadier, though there is still some shading from $1.15 for mine-run, but on the other hand some good grades cannot be secured at that figure. The slack market has firmed up further and it is now on the regular basis of 90c., with some operators quoting $1. The market is quotable approximately as follows: Slack, 90c.; nut and slack, $1; nut, $1.10; mine-run, $1.15; ¾-in., $1.25; 1¼-in., $1.35, per net ton at mine, Pittsburgh district. These are prompt prices. There are no circular prices out. Some time ago one or two operators put out a circular based on $1.20 for mine-run, but this was not adopted generally. The Pittsburgh Coal Co. has issued no circular prices and nominally its circular prices are the old ones based on $1.30 for mine-run. This interest will name new circular prices about Apr. 1, when a number of current contracts expire.

COLUMBUS

The continued cold weather has stimulated trade. Prices are steadier and the volume of business larger. Better times anticipated after the first of the year.

Zero weather has had a beneficial effect on the coal trade. Prices have stiffened materially and the volume of business is increasing while a better tone is noted on all sides.

Domestic business was stimulated to the greatest extent by the more favorable weather. Dealers' orders are coming in better all along the line and one of the best features is the request for immediate shipment. The retailers' stocks are only fair and the colder weather has made it necessary for them to cover promptly.

The steam trade is still slow but a slight improvement was reported during the week. Manufacturing seems to be increasing and the colder weather makes the fuel consumption larger; railroads, for instance, require an increased tonnage for handling their trains. The small sizes are still strong but this condition is not expected to continue with the increased production of lump. Nut, pea and slack are selling around 70c. and coarse slack is only 10c. less. Steam plants which use slack exclusively have had difficulty in getting their requisitions filled.

Production during the past week has shown a substantial gain; although a holiday intervened and Saturday was a day of idleness the output compares very favorably with previous weeks. In the Jackson field the production is now about 70% of normal and the same prevails in Crooksville and Cambridge.

Prices in the Ohio field are:

	Hocking Valley	Pomeroy	Kanawha
Rescreened lump	$1.55	$1.65	.....
Inch and a quarter	1.50	1.55	$1.40
Three-quarter inch	1.35	1.40	1.35
Nut	1.15	1.25	1.15
Mine-run	1.10	1.15	1.10
Nut, pea and slack	0.70	0.25	0.65
Coarse slack	0.60	0.65	0.55

CINCINNATI

Continued cold weather and improvement in manufacturing circles have stimulated the market on all sides. Indications are that activity has begun and will continue, with much better prices.

A steadily increasing activity in all branches of the coal trade has developed an improved domestic demand and an unexpectedly heavy call for steam coal. The light buying of the past two or three months has given way to something like an urgent demand, due probably to the fact that stocks are low. The first week or so of severe weather depleted the surplus stocks rapidly, leaving the dealers with an inadequate supply for their trade. A rush of orders, especially for immediate delivery, naturally resulted.

The most encouraging factor, however, is the improvement in the steam demand. Large consumers seem to have made up their minds that the business depression is over, and are placing their orders with apparent confidence. The increasing demand for slack for coking purposes is also having a strong effect on this grade.

CLEVELAND

The coal market is holding up well in spite of the holidays. Receipts are light, but the demand is fair. Surpluses being cleaned up.

Manufacturing plants running full time the last few weeks have not closed down over the holidays as is often done, and most of those working part time will put in a few days during the holidays. This has kept the demand for steam coal well up to the production. A little warmer weather has taken the edge off the retail demand, but it is still cold enough to keep the business moving.

Only 300 cars of coal arrived here Monday. The mines worked up to Friday, but did nothing more until Monday. This will reduce the movement the rest of the week and by New Years the market will be clean. Receipts this week have been put in on contracts, and jobbers and operators did not try to place coal with outside trade.

There has been very little change in the spot price for mine-run and three-quarter coals and slack is holding up to $1.75. The coal that is coming here is being moved on contract, as shipment prices are higher than spot quotations. Jobbers paid $1.72½ for fine coal at the opening of the week and sold it at $1.75 to regular customers. This was spot business.

The domestic market is stronger and prices are firm on high-grade coals. Pocahontas, which was low a week ago, is stronger and cannot be bought below shipment prices.

For shipment the prices are as follows:

	Pocahontas	Youghiogheny	Bergholz	Fairmount	W. Va. No. 8
Lump	$3.60	.....	.....	.....	.....
Lump, 6 in.	.....	.....	$2.45	.....	.....
Egg	3.60	.....	.....	.....	.....
Egg, 6 in.	.....	.....	2.10	.....	.....
Lump, 1½ in.	.....	$2.45	2.25	.....	.....
Lump, ¾ in.	.....	2.30	2.10	$1.95@2.00	$2.00
Mine run	2.65	2.25	1.95	1.85@1.90	1.90
Slack	2.40	1.80@1.85	1.75	1.85	1.80

COKE

CONNELLSVILLE

Furnace coke contracting movement concluded, with only two or three deals hanging over. Few sellers participated, others awaiting higher prices later. Production slightly increased while shipments decrease 12,000 tons.

The furnace-coke contracting movement is now over for the present. Two or three contracts are hanging, the prospective consumers desiring to wait until the end of the month before closing finally, in order to have an opportunity to test the coke involved, which is now being shipped on a temporary arrangement. The feature of the movement just ended is that almost all the coke was sold by three interests, Washington Coal & Coke Co., W. J. Rainey and J. H. Hillman & Sons Co. The Producers Coke Co., of Uniontown, has sold some coke, but no large proportion of the capacity for which it acts as sales agent. Those who did not sell coke are expecting to obtain much better prices later, when fresh demand arises, as the furnaces now idle have not contracted. We quote: Prompt furnace, $1.60; contract furnace, $1.75; prompt foundry, $2@2.20; contract foundry (nominal), $2.35@2.50 per net ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Dec. 19 at 198,533 tons, an increase of 2258 tons, and shipments at 188,049 tons, a decrease of 12,009 tons.

BUFFALO

When the iron trade is making good progress there will be a better report possible of coke, but for the present the demand for both is not what it should be. The Buffalo customhouse report of iron-ore receipts shows 2,882,030 tons by Lake for the season of 1914 and 5,208,930 tons for 1913. Furnaces in this district are running faster than they were, but are not really active. Coke prices are $4.25 for best 72-hr. Connellsville foundry and $3.30 for stock coke.

CHICAGO

A better demand has developed for domestic sizes and continued improvement is noted for furnace and foundry coke. Prices are as follows: Byproduct, $4.75@4.95; Connellsville, $4.75@5; Wise County 72-hr. (select), $5; gas coke, $4.25@4.50; furnace coke, $4.50@4.75.

ST. LOUIS

There are several small inquiries out for foundry coke for the first of the year and rumors that large inquiries will be sent out on the first. During the past week two or three small orders were placed for byproduct coke for domestic purposes, to be shipped after the first. Local gas house is in good demand and moving fairly good, with indications that a greater tonnage will move during the month of January than ever before. Retail prices per short ton delivered to consumers are: Local gas house, $5.75; byproduct, $6.25@6.50.

SOUTHERN

BIRMINGHAM

Lump coal shows some improvement but steam grades continue quiet.

The past ten days have been very cold, with sleet and snow, and as a consequence, lump coal has shown some improvement for immediate shipment, though prices are below the regular schedule and the retail yards are buying only in small quantities. Steam coal does not seem to have improved any, the demand being light and many of the mines will remain closed after the holidays until the demand is better. Blacksmith coal is in a normal condition, and while the demand is not quite what it should be, due to the general business conditions, still the operators seem to have no cause for complaint. Some large sales of pig iron have recently been made, but prices are low.

LOUISVILLE

Reduced operations over the holidays and increased demand as a result of the cold weather have steadied up the market.

Though operations were reduced to a minimum during the holidays, it is expected that work will now be resumed on a more general scale. Conditions seem to be better and there appears to be a more buoyant, confident feeling in all lines of commercial activity.

Prices are up slightly as follows: Block, $1.60 to $1.80; lump, $1.40 to $1.50; straight run-of-mine, $1 to $1.10; four-inch steam lump, 80 to 85c.; six-inch lump, 90 to 95c.; nut and slack, best grades, 60 to 75c., all prices f.o.b. mines.

MIDDLE WESTERN

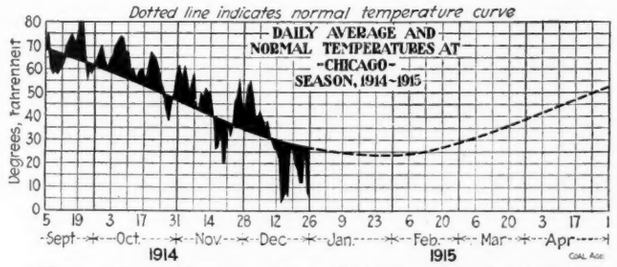
CHICAGO

Continued zero weather gives an impetus to the market. Domestic coals firm. Screenings very strong. Anthracite demand good.

A week of weather averaging near the zero mark has moved up prices generally. The buying of domestic coals from country districts has been very active. Local yard sales have increased in an impressive manner, and there has been a pronounced buying movement on the part of householders, apartment and office buildings.

Steam coals are still advancing under the influence of the increased orders from factories and screenings are averaging 80c., while it is reported some shipments have been sold as high as 95c.

There is no question but that the decision of the Interstate Commerce Commission to allow the 5% rate case will greatly stimulate industrial conditions in this market. The heavier demand has increased operations at all the Illinois and Indiana mines to maximum capacity, and the coal is seemingly absorbed as fast as shipped. In the Indiana field particularly all the mines have been operating every day, and a great many idle miners have been able to return to work.



There still continues to be a shortage of chestnut anthracite in this territory, while egg and stove sizes about equal the demand. Prices are well sustained.

The market for smokeless coals has improved and prices are firmly held.

Indiana coals are in lively demand. Shipments are confined mostly to local territory and there is comparatively little coal moving into Chicago.

There is a tendency toward higher prices for Franklin County coals. Steam sizes have a strong undertone.

Hocking grades have been scarce and prices are stiffer.

The demand for splints has improved, but not much change is noted in quotations.

Springfield domestic coals are in good demand, and screenings are still strong.

The market is steady for Eastern Kentucky coals, and sales have increased.

Prevailing quotations are as follows:

	Franklin Co.	Springfield	Sullivan	Clinton	Carterville
Lump	$1.50@1.75	$1.50	....	$1.50@1.60	$1.75
4-in. lump	....	....	$1.60@1.75	....	....
Steam lump	....	....	....	1.20	....
2½-in. lump	....	....	1.50	....	....
1¼-in. lump	....	....	1.35@1.50	....	....
Mine-run	1.15@1.25	....	....	1.10	....
Egg	1.40@1.60	....	....	1.50	....
No.1washed	....	....	....	....	1.60@1.75
No.2washed	....	....	....	....	1.50@1.75
6x3-in. egg	....	1.50	....	....	1.60@1.75
Nut	....	1.35	....	....	....
No. 1 nut	1.75	....	....	....	....
No. 2 nut	1.40@1.60	....	....	....	....
Screenings	0.80@0.85	0.75	0.70@0.85	0.75@0.80	....

	Harrisburg	E. Kentucky	N. Riv. & Poca.	Somerset	Hocking
Lump	$1.75	$1.75@1.95	....	....	....
1¼-in. lump	....	....	....	....	$1.50@1.60
Lump & egg	....	....	$2.25	$2.25	....
Mine-run	1.20@1.30	....	1.40	1.40	1.25
Egg	1.60@1.75	1.60@1.75	....	....	....
No. 1 nut	1.75	....	....	....	....
No. 2 nut	1.40@1.60	....	....	....	....
Screenings	0.80@0.85	....	....	....	....

Green County 5-in. lump, $1.50@1.65; 3-in. lump, $1.30@1.40: 5-in. egg, $1.30@1.40; 3-in. egg, **$1.30; mine-run,** $1.10.

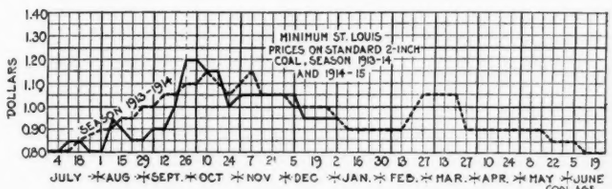
ST. LOUIS

Business satisfactory at the moment and the outlook better than for some time. Prices showing a tendency to advance. Some operators are now well covered.

Moderate winter weather has kept the local market in fairly good shape. It might be better, and could be worse, but in a general way there is little to complain of. Tonnage is usually light during the Christmas holidays, unless there be some extremely cold weather, and this brings to the retailer what is known as charity business.

There is a distinctly optimistic air as regards the future, and unless all signs fail, business conditions will soon be materially improved. There is no complaint as to the tonnage moving in from the higher grade fields of Williamson and Franklin Counties, and the prices are fairly good. During the past week there has been a slight increase in lump and egg, and the washed sizes, and there has been no important decrease in the steam sizes. The local market is not as strong on steam coal as the Chicago market, and several hundred cars have been moved there from St. Louis.

A few operators in Williamson and Franklin Counties are sold up so far that they are now asking $1.75 on lump and egg and No. 1 washed, but this is not general, the top of the market being about $1.60 to $1.65 and the bottom about $1.35 to $1.40.


MINIMUM ST. LOUIS PRICES ON STANDARD 2-INCH COAL, SEASON 1913-14 AND 1914-15
SEASON 1913-1914
DOLLARS
1.40
1.30
1.20
1.10
1.00
0.90
0.80
4 18 1 15 29 12 26 10 24 7 21 5 19 2 16 30 13 27 13 27 10 24 8 22 5 19
JULY AUG SEPT. OCT NOV DEC JAN. FEB. MAR. APR. MAY JUNE
COAL AGE.

In the Standard field conditions are normal, 6-in. lump bringing anywhere from $1.20 to $1.30 or $1.35, and 2-in. lump from $1.10 down to 95c. Screenings are still strong at from 55 to 60c., and the Chicago buyers are paying as high as 65c.

The country demand for both high grade and Standard is fairly good, and promises to continue.

No smokeless moving in, and anthracite is slow. Higher prices can be looked for on domestic sizes from now on and there will likely be a weakening on the steam grades.

Market is quotable on the following basis:

	Williamson and Franklin Co.	Big Muddy	Mt. Olive	Standard	Sparta
2-in. lump	.....	....	$1.25	$1.00@1.10	$1.10@1.15
3-in. lump	.....	....	1.40	....	.....
6-in. lump	$1.40@1.65	....	1.50	1.15@1.30	1.20@1.30
Lump and egg	1.85@2.15	$2.25	.....	....	1.35
No. 1 nut	1.30@1.40	....	.....	0.90@0.95	.....
Screenings	0.50@0.55	....	0.80@0.85	0.55@0.65	0.60@0.65
Mine-run	1.00@1.10	....	.....	0.85@0.90	.....
No. 1 washed nut	1.60@1.75	2.00	1.60	....	.....
No. 2 washed nut	1.40@1.50	....	1.45	....	.....
No. 3 washed nut	1.15@1.20	....	.....	....	.....
No. 4 washed nut	1.10@1.15	....	.....	....	.....
No. 5 washed nut	0.75@0.85	....	.....	....	.....

The local retail market is quotable on the following basis: Carterville, 14c. per bushel or $3.50 per ton; Mount Olive, 12c. per bushel or $3 per ton; Standard, 11c. per bushel or $2.75 per ton; Smokeless, West Virginia, $6.50 per ton; Pennsylvania anthracite chestnut, $8.50; egg and stove, $8.25; grate, $8; Spadra Arkansas anthracite, all sizes, $7.50 per ton.

SAN FRANCISCO

Colder weather stimulates the trade and dealers are rushed with urgent orders.

The weather has been unusually cold the last week, with heavy rainfall and dealers are rushed with deliveries now, while inquiries are still numerous. Prices continue at $9.50 to $11 for anthracite, while steam coal is wholesaling at $6.50 and domestic at $7.50. Many shipments of coke have arrived during the past few days and several large vessels are now unloading.

KANSAS CITY

The zero weather stimulated the market only a little. Prices still unchanged. Retail business active.

The coal market in Kansas City has not felt the stimulation that the last two weeks of cold weather should have brought. Most of the dealers account for this by the fact that the gas this year has been more plentiful. There has been no change in prices and none is expected before Jan. 15 and possibly not until the first of February. In the meantime the October circulars are being adhered to very closely.

Most of the retailers are doing very well as the streets are moderately free of ice and snow, making deliveries easy, but this has not benefited the wholesaler. The retailers had large supplies on hand, and the operators and wholesalers are selling but very little more than they did before the cold spell set in. Two more weeks of the present weather will be required to set the business going all around. Kansas coal seems to be holding its own very well, especially slack. Illinois coal is steady and selling at $1.75.

PORTLAND, ORE.

Cold weather increases activity in coal business here. Severest weather for almost 20 years.

The Pacific Northwest has had freezing weather for almost three successive weeks, with the thermometer down to 23° most of the time at night. This caused an active demand for coal and if it continues long it will mean a good volume of business soon after the first of the year, as consumers here stock up only sufficient to carry them through a couple of months of cold weather. It is reasonable to presume that January and February and possibly March will bring some cold weather and if so, supplies in the hands of the consumers are going to be low long before the winter months have passed. Prices have shown no advance as yet.

Coal Contracts Pending

Contracts listed in this department are authoritative in every respect except where the source of information is questionable in which event it is noted. All contracts are listed promptly on receipt and only repeated when additional information becomes available or in the last issue previous to the day on which bids will be closed. Liberal remuneration will be paid for all legitimate notices of this kind sent in.

Contract No. 22—Philadelphia, Penn.—This contract, which provides for furnishing the city with 225,000 tons of anthracite and bituminous coal for next year (pp. 933, 952, 1009, 1048, Vol. 6) has been bid on by 40 different agencies. The results have not yet been announced. Address Director Loeb, Room 225, City Hall, Philadelphia, Penn.

Contract No. 39—Youngstown, Ohio—Press reports state that sealed proposals are requested by the Director of Public Service until Jan. 4, for furnishing and delivering 20,000 tons of coal f.o.b. cars at the City Water Works Pumping Station, Filtration Plant, and City Crematory. A certified check for $2000 must accompany each bid. Address H. C. Fox, Clerk, Department of Public Service, Youngstown, Ohio.

Contract No. 40—Paducah, Ky.—The municipal light plant at this place will contract for 1200 tons of mine-run coal this month, deliveries to be made over the next year. The customary price is $1.85 per ton. Address J. O. Keehler, superintendent of light department, Paducah, Ky.

PRODUCTION AND TRANSPORTATION STATISTICS

PENNSYLVANIA RAILROAD

The following is a statement of shipments over the P. R.R. Co.'s lines east of Pittsburgh and Erie for November and eleven months of 1913 and 1914, in short tons:

	November 1914	November 1913	Eleven Months 1914	Eleven Months 1913
Anthracite	1,017,942	987,487	10,223,221	9,699,210
Bituminous	3,667,385	4,509,375	44,013,552	47,171,538
Coke	602,573	999,500	8,926,580	13,011,863
Total	5,287,900	6,496,362	63,163,353	69,882,611

SAULT STE. MARIE CANALS

Coal shiments through the Sault Ste. Marie Canals for December and the season compare as follows:

	December Canal U. S.	December Canal Can.	December Total	Season Canal U. S. 1913	Season Canal Can. 1914	Decrease Tons	Decrease %
Anthracite	61,650	12,300	73,950	2,744,574	2,240,505	504,069	18
Bituminous	55,000	.....	55,000	15,878,364	12,246,716	3,631,648	23
	116,650	12,300	128,950	18,622,938	14,487,221	4,135,717	

BITUMINOUS COAL MOVEMENT

The following is a summary of the movement of coal and coke over 13 principal railroads during September and the first nine months of the last two years, in short tons:

	September		9 Months	
Anthracite	1913	1914	1913	1914
Baltimore & Ohio[1]	126,919	122,436	1,060,724	991,180
Chesapeake & Ohio[1]	1,006	2,526	12,994	13,163
Erie[2]	749,687	823,037	6,489,298	6,923,458
Pennsylvania[1 3]	813,394	996,528	7,665,020	8,149,935
Virginian[2 1]	50	69	859	317
Total 5 roads	1,691,056	1,944,596	15,228,895	16,078,053
Bituminous				
Baltimore & Ohio[1]	3,148,994	3,034,868	27,250,529	24,931,152
Buffalo, Roch. & P.[1 2]	851,501	707,839	7,052,765	6,047,795
Buffalo & Susq.[1 2]	132,667	90,247	1,339,193	867,651
Chesapeake & Ohio[1]	1,581,037	2,003,765	12,618,033	15,580,341
Erie[2]	12,726	6,319	306,466	58,569
Hunt. & Br'd T. Mt.[1 2]	112,483	90,415	1,007,396	771,702
New York Central[3]	815,989	658,361	6,769,567	5,980,945
Norfolk & Western[1 2]	2,109,476	2,509,916	17,934,899	19,880,107
Pennsylvania[1 3]	4,378,037	4,291,425	37,774,323	36,112,774
Pitts. & Lake Erie[1 2]	1,082,360	922,356	9,668,295	8,573,785
Pitts. Shaw. & North[1 2]	238,849	194,453	2,037,169	1,706,532
Virginian[1 2]	393,199	379,113	3,291,941	3,055,093
Western Maryland	271,734	255,615	2,542,963	2,303,381
Total 13 roads	15,129,052	15,144,692	129,593,539	125,969,827
Coke				
Baltimore & Ohio[1]	387,704	237,661	3,609,074	2,575,455
Buffalo, Roch. & P[1 2]	36,996	24,824	413,103	210,270
Buffalo & Susq.[1 2]	24,506	47,874	224,538	297,236
Chesapeake & Ohio[1]	29,680	13,439	266,886	267,408
New York Central[3]	.....	.....	36,207	.....
Norfolk & Western[1 2]	121,451	59,112	1,180,960	807,443
Pennsylvania[1 3]	1,127,951	736,261	10,859,413	7,603,937
Pitts. & Lake Erie[1 2]	525,931	390,388	5,182,891	3,913,834
Pitts. Shaw. & North[1 2]	.....	.....	9,383	.....
Western Maryland	5,991	3,079	59,223	51,689
Total 10 roads	2,260,210	1,512,638	21,841,678	15,727,272

Total Coal and Coke 13 Roads	1913	1914
January	19,314,523	18,157,998
February	17,594,079	15,446,830
March	17,672,305	20,233,213
April	16,882,326	15,497,444
May	19,015,721	16,523,385
June	18,610,757	16,984,476
July	18,736,979	17,589,427
August	19,757,104	18,740,453
September	19,080,318	18,601,926
Total, 9 months.	166,664,112	157,775,152

[1] Includes coal received from connecting lines.
[2] Includes company's coal.
[3] Does not include company's coal hauled free.

Note:—The Southern Railway hauled 351,899 short tons of bituminous coal during August, 1914, and 2,616,314 short tons during the seven months ending Aug. 31, 1914.

NORFOLK & WESTERN RY.

The following is a statement of coal handled by the N. & W. Ry. during November and the past four months of last year in short tons:

	August	September	October	November
Pocahontas Field	1,277,621	1,390,531	1,021,699	837,577
Tug River District	293,179	295,332	270,651	253,975
Thacker District	286,572	295,776	264,528	235,080
Kenova District	105,724	110,158	112,455	90,772
Clinch Valley District	134,408	158,393	84,530	237,831
Other N. & W. Territory	4,211	4,781	4,860	3,849
Total N. & W. Fields	2,101,715	2,254,971	1,758,723	1,659,084
Williamson & Pond Creek R.R.	91,813	85,053	70,338	62,505
All other railroads	257,280	169,892	168,778	131,269
Grand total	2,450,808	2,509,916	1,997,839	1,852,858

Destination of shipments over this road for November and the first eleven months of last year and the year before were as follows, in short tons:

	November		Eleven Months	
Coal	1913	1914	1913	1914
Tidewater, foreign	50,154	109,095	1,392,064	1,795,486
Tidewater, coastwise	269,169	288,201	3,474,018	3,508,282
Domestic	1,865,015	1,455,562	18,084,882	18,527,036
Coke				
Tidewater, foreign	16	.....	30,507	339
Domestic	120,450	74,468	1,445,944	945,197
Total	2,304,804	1,927,326	24,427,415	24,776,340

SOUTHWESTERN TONNAGE

The following is a comparative statement of the Southwestern tonnage for July and the preceding two months of the years 1913 and 1914:

	May		June		July	
State	1913	1914	1913	1914	1913	1914
Missouri	186,366	165,395	187,723	185,731	198,723	177,093
Kansas	407,124	370,097	412,371	490,561	465,761	513,312
Arkansas	130,020	95,749	145,306	133,350	163,185	117,016
Oklahoma	252,901	241,180	255,481	273,692	272,124	234,648
Totals	976,411	872,421	1,000,881	1,083,334	1,099,793	1,042,069

This statement only covers the tonnage of members of the association, which is estimated to be at least 95% of the entire production.

I. C. C. No. 6653—Schrager Coal Co. vs. Delaware, Lackawanna & Western R.R.

Carload rates on anthracite coal from Schrager's washery, near Taylor, Penn., to tidewater points in New Jersey found unreasonable to the extent they exceed the rates to same points from Taylor. Reparation awarded.

FOREIGN MARKETS

GREAT BRITAIN

Shortage developing and market tense. Export trade continues the same but with vessel tonnage becoming scarcer.

Dec. 18—The London coal trade continues exceedingly brisk. Public prices advanced 24c. on Friday last, and all pit prices are either withdrawn or advanced. Altogether the market is very excited, and the shortage of all qualities by rail and by sea is causing intense difficulties. The depot trade is slow.

The main features of the coal export trade during the past week have not changed, except to become slightly more accentuated. Tonnage, for instance, has been even less plentiful owing to the severe weather. Curiously enough, Cardiff has been an exception, for boats have arrived quite freely. Prices here have strengthened, and the outlook appears much more favorable. The pre-holiday demand is having its effect upon the inland trade markets. Those in Lancashire show an all round improvement, while marked increases in demand are also found throughout Yorkshire and Derbyshire. In both the latter cases wagon scarcity is causing great inconvenience. The Scottish coal trade is again active.—"The Colliery Guardian."

Dec. 18—Business is difficult to arrange owing to congestion. Values all round have a harder tendency and are approximately as follows:

Best Welsh steam	$5.04	Best Monmouthshires	$3.96@4.08
Best seconds	4.32@4.56	Seconds	3.84@3.96
Seconds	4.08@4.20	Best Cardiff smalls	2.88
Best dry coals	4.56	Cargo smalls	1.98@2.22

The prices for Cardiff coals are f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f.o.b. Newport, both net, exclusive of wharfage and for cash payment.

Freights—Chartering is less active owing to stemming difficulties. Rates are approximately as follows:

Gibraltar	$3.24	Venice, Ancona	$6.84	Singapore	$5.28
Malta	3.48	Alexandria	4.95	Las Palmas	2.64
Marseille	4.20	Port Said	4.98	St. Vincent	3.00
Algiers	3.80	Aden	5.04	Rio Janeiro	3.96
Genoa, Savona	4.32	Colombo	5.04	Monte Video	3.48
Naples	4.38	Sabang	5.04	River Plate	3.72

Exports—British exports for November and the first eleven months of the past three years were as follows:

	November			Eleven Months		
To	1912	1913	1914	1912	1913	1914
Russia	230,544	379,347	1,773	3,859,229	5,598,119	3,087,805
Sweden	421,431	404,540	378,524	3,760,592	4,183,554	3,959,216
Norway	250,621	207,766	177,735	2,005,631	2,096,394	2,282,638
Denmark	286,328	244,970	252,457	2,521,576	2,739,555	2,833,642
Germany	785,086	677,074	.....	7,700,534	8,296,487	5,256,765
Netherlands	235,685	157,610	65,628	1,811,015	1,869,803	1,631,581
Belgium	149,920	162,091	997	1,399,403	1,890,316	1,167,546
France	1,086,703	1,031,427	1,036,949	9,260,137	11,676,356	11,083,759
Portugal[1]	146,930	101,724	96,152	1,147,259	1,226,596	1,084,772
Spain and Canaries	350,676	280,749	132,730	3,118,654	3,354,902	2,792,016
Italy	873,867	784,135	603,161	8,355,453	8,844,673	7,865,777
Austria-Hungary	41,074	78,066	.....	654,390	977,906	564,362
Greece	79,468	75,573	23,783	577,695	666,857	534,163
Roumania	10,100	28,822	.....	195,000	226,203	218,218
Turkey	5,983	61,156	.....	348,360	307,838	429,506
Egypt[2]	261,939	315,300	94,412	2,644,066	2,803,630	2,456,070
Algeria	125,962	113,832	44,039	955,131	1,174,495	856,562
Portuguese W. Africa	10,499	12,838	1,502	264,854	213,828	158,954
Chile	30,451	49,052	3,776	522,541	542,003	374,549
Brazil	182,435	137,971	63,350	1,472,758	1,731,663	1,101,564
Uruguay	62,074	56,039	14,826	781,372	657,793	541,491
Argentine Republic	343,594	290,262	152,775	3,037,596	3,312,713	2,688,565
Channel Is.	16,110	16,667	13,475	163,619	153,226	153,015
Gibraltar	31,815	40,897	20,493	307,483	320,999	274,815
Malta	64,460	73,060	9,514	392,755	621,489	333,748
Aden[3]	10,383	5,981	.....	175,375	154,540	135,817
British India	1,482	11,955	11,423	114,371	152,003	151,207
Ceylon	18,299	15,420	4,807	212,341	213,542	244,678
Other countries	83,526	99,080	75,879	987,846	1,163,182	1,078,205
Coke	125,601	126,307	100,202	928,612	1,115,317	1,075,405
Briquettes	142,025	163,087	46,737	1,394,032	1,874,952	1,534,680
Total	6,465,071	6,202,798	3,427,099	61,070,280	70,160,934	57,951,092
Bunker	1,714,064	1,755,090	1,249,955	17,634,865	19,189,501	17,287,534

[1] Includes Azores and Madeira. [2] Including Anglo-Egyptian Sudan. [3] And dependencies.